



China Mobile Case Study

Mini Apps on Messaging Applications

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中国移动
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1. Introduction

1.1 Background

With advanced Application 2 Person (A2P) messaging capability, Messaging as a Platform (MaaP) offers significant advantages and brings great potential commercial opportunities to MNOs and the wider ecosystem.

However, Instant Messaging (IM) services have gone beyond the basic A2P messaging. In China, for example, the two most popular OTT applications, WeChat and Alipay, are reinforced with web based applications called Mini Apps which are incorporated within the IM clients. These OTT applications are seeing huge benefits as a result of this aggressive effort.

1.2 Definition

Mini Apps are web applications coupled in IM clients, with the following characteristics:

- Specific pages or areas of IM clients are exclusively reserved to list, search and use Mini Apps. Thus, they can be activated without leaving the IM clients.
- Mini Apps are usually HTML5 based and are able to execute within the IM clients, similar to executing on a web browser. Thus, a wide range of functions with user friendly interfaces can be integrated into IM clients by using the features of HTML5 standard.
- Additional functions from IM clients such as SSO (Single Sign On) can be integrated to Mini Apps.

1.3 Use Case Examples

In WeChat and Alipay, there is a wide range of Mini Apps serving everyday activities such as: gaming, entertainment, travelling, office automation, ticket-booking, taxi booking, bike hire, restaurant reservations, utility payments, official document reviewing etc.

- Booking a cinema ticket:
 - The user selects the movie and seat and then submits the booking request and pays for the ticket.
 - The user receives the ticket (e.g. QR code) in the chatbot conversation view.
 - The ticket can also be viewed via the Mini App.
- Booking a taxi:
 - The user selects or types in time, destination and number of passengers, and then submits the request.
 - The user tracks the taxi in real-time on the map view on the Mini App page while the driver is on their way to the pick-up point.
 - Once the journey is complete, payment is made via the Mini App page and a detailed receipt is displayed on the conversation screen.
 - The user can rate their taxi driver and select him or her as a “preferred driver”. The next time they request a taxi, the user can choose to pay more for a preferred driver.

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- Reserving a table at a restaurant:
 - The user chooses a restaurant, selects the date, time and number of guests and submits the request.
 - The Mini App lists the pictures or a seating layout, the user selects their preferred table and submits the booking request.
 - The user receives the booking confirmation message in the chatbot conversation view.
 - Purchasing goods online:
 - The user can view a product's description, pictures and comments on the Mini App pages.
 - The user submits the order and completes the payment on the Mini App page.
 - The user receives delivery notifications in the chatbot conversation view.
 - After the orders are delivered, the user can share a rating and review the purchase summary.
 - Searching for a specific product:
 - The user searches for the product on the Mini App page and is presented with a list of online retailers.
 - The user selects their preferred retailer and places an order.
 - The user completes the purchase and is given the option to save the retailer's loyalty card for future use.
 - The user can recommend the retailer to friends and receive a discount for their next purchase.
 - Ordering take-away food or coffee:
 - The user selects their food and drink and places the order.
 - The user can share their location and proximity to the pick-up address to ensure their order is ready in time for when they arrive to collect it.
 - The user pays in advance on the Mini App page and receives the payment confirmation or pick-up token message in the chatbot conversation view.
 - Taking part in market research
 - The user subscribes to a market research panel, submits their answers on the Mini App page and receives a discount voucher or incentive in return by message.
 - The user subscribes to their chosen news provider and selects a specific topic of interest on the Mini App page. The user selects an answer from the list of options and uses optimised keyboard layouts to request more specific information.

2. OTT Mini App Case Study

2.1 WeChat Case Study

WeChat is the most popular social App with over 800 million users. More than 60% of users have used its Mini App functions and the following features:

- WeChat App provides its own Mini Apps as well as third party Mini Apps which cover a wide range of payment scenarios such as utilities, credit pay, healthcare, petrol, taxis, etc.
- The Mini App icons are displayed on a main page dedicated for the Mini Apps.
- A Mini App can be opened in the WeChat App when its icon is clicked. SSO (single-sign-on) is supported and there is no need to enter username and password credentials.
- Mini Apps can send messages to the users through its official account.

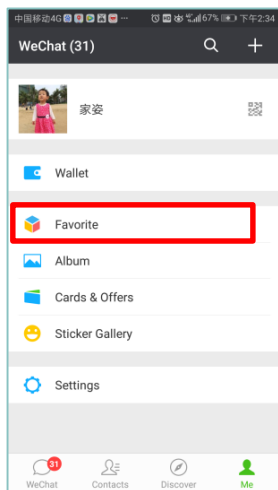


Figure 1: Mini Apps icon

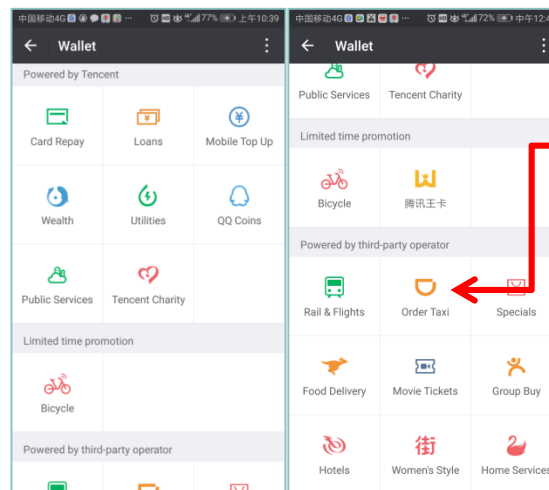


Figure 2: Mini Apps main page

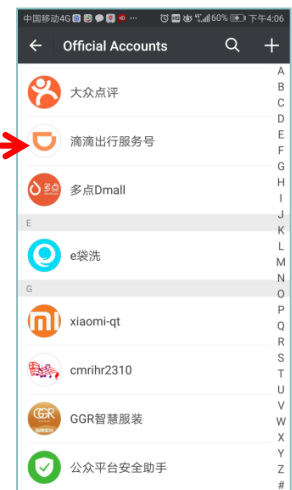


Figure 3: Conversation list

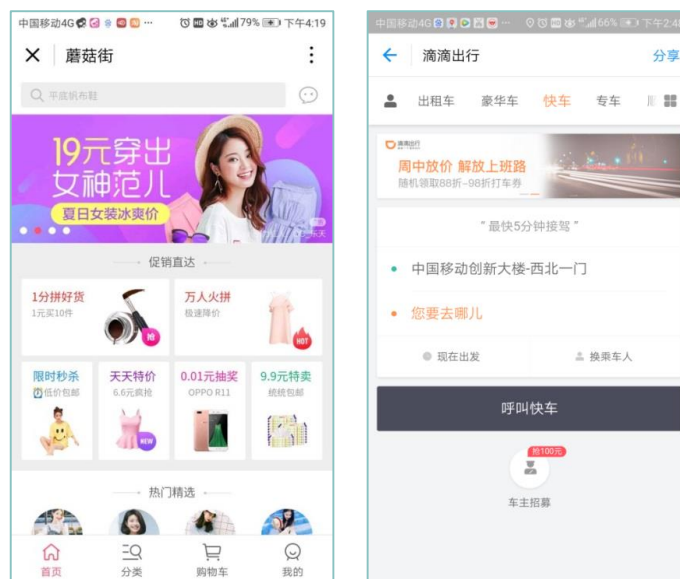


Figure 4: Mini App examples (shopping and taxi booking)

2.2 Alipay Case Study

Alipay is the biggest payment App with over 600 million users. Alipay has a number of payment Mini Apps for banking, shopping, entertainment, wealth management, education, public welfare and other third-party services.

It has the following features:

- Alipay app provides its own Mini Apps and third party Mini Apps which cover a wide range of payment scenarios, such as utilities, credit pay, healthcare, petrol, taxis, etc.
- The Mini App icons are displayed on a main page dedicated for the Mini Apps.
- A Mini App can be activated in the Alipay App when its icon is clicked. SSO (single-sign-on) is supported and there is no need to enter username and password credentials.
- Users can edit the favorite Mini Apps list.
- Mini Apps can send messages to the users through their official accounts.

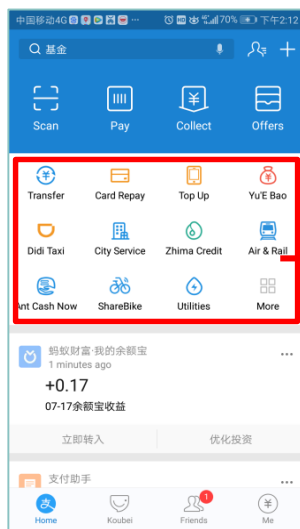


Figure 5: Mini Apps icon

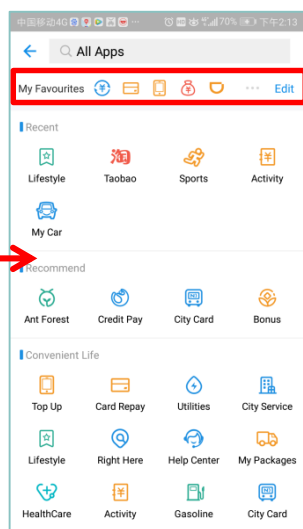


Figure 6: Mini Apps main page

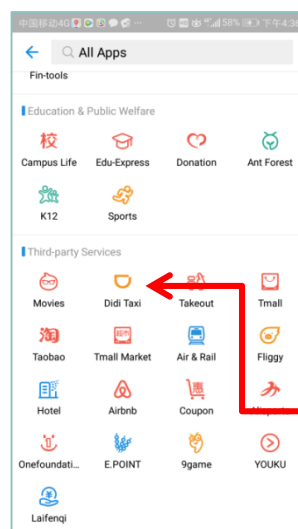


Figure 7: Conversation list



Figure 8: Mini App examples (Taxi booking, shopping, hotel reservations)

3. Business Drivers

Mini Apps bring a range of benefits to the entire messaging eco-system.

3.1 User Requirements

Although advanced messaging (including OTT IM and RCS) brings rich messaging functions and a friendly user experience, users may still desire extended functions and improved visual interaction.

3.1.1. Quick and Clear in Complex Visual Interaction

The messaging/chat is a single-dimensional interaction pattern. The user and the chatbot interact in a 'linear-threaded' conversation, i.e. deciding one piece of information after each round of two-way conversation. In cases of complex user interaction, this may take time and can be exhaustive.

A Mini App can serve as a more efficient way for scenarios requiring multiple rounds of interactions such as ordering food from a restaurant chatbot. To order a typical KFC lunch as shown in the figure 9 below:

- When using linear-threaded chat, over 10 rounds of conversation are required. If the user wants to change the order, it may become even more exhaustive.
- When using a Mini App, just one page is enough, and making modifications to an order is also very straight-forward.

The process when using linear-threaded chat would be easier and more efficient with rich cards and suggested replies, however it would still be time-consuming and less efficient in comparison to the Mini App interface.

1. main course: sandwich, wrap, noodle...
User: sandwich

2. sandwich type: chicken, beef, codfish...
User: beef

3. size: large, medium
User: large

4. flavour: spicy, plain
User: spicy

5. how many?
User: two

6. add chips?
yes. Chips

7. large, medium
User: medium

8. sauce: ketchup, sweet marmalade
User: ketchup

10. drinks: coffee, sprint, cola...
User: cola

11. which cola: Coca cola, Pepsi Cola...
User: Pepsi Cola

12. large cup, medium cup, small cup
User: small cup

13. icy or normal temperature
User: icy

14. anything else?
User: No

15. summary of order: Two large, spicy beef sandwiches, one medium pack of chips with ketchup and one large, icy Coca Cola.
User: Confirm.

Main course

sandwich	chicken	large	spicy	one
wrap	beef	medium	bland	two
noodle	prok			three
rice				four
...				...

Chips

chips	large	ketchup
no chips	medium	sweet marmalade

Drink

coffee	Coca	large	icy
sprint	Pepsi	medium	normal
Cola		small	hot

Confirm

YES

Figure 9a: Dinner Order - Chat

Figure 9b: Dinner Order - Web

3.1.2. Easy to Access Less-Frequently-Used Applications

Mini Apps provide an alternative, less stressful solution to the mobile applications that are frequently installed but rarely used. Users can find and activate Mini Apps from IM clients without the need to download and install.

For example, there are various bike rental mobile applications in China, and it would not be efficient to download all of the mobile applications serving a similar function.

Many bike rental Mini Apps can be accessed from within WeChat and Alipay clients. Without installing such individual mobile applications, WeChat and Alipay users can use most fundamental functions such as locating, renting and returning a bike.

3.1.3. Re-Use Common Capabilities in IM Clients

Since Mini Apps are integrated with IM clients, IM's common capabilities can be utilised to further facilitate Mini App usage. For example, when renting a bike from within WeChat, the user can:

- Skip registration and log in while using the WeChat SSO facility
- Skip depositing money for each individual bike rental Application and instead deposit only once in WeChat.
- Submit comments and rating via WeChat after renting a bike.

3.2 IM Service Providers' Requirements

Being substantially enriched by a host of Mini Apps, IM acquires a wide range of benefits:

- Encourage users to use IM clients more often
- Acquire more data traffic
- Collect users' preference/profile data when users search and activate Mini Apps
- Increase users' loyalty
- Create new opportunities for building business relationships with third-party service providers and applications

3.3 Third-Party Service Providers' Requirements

Benefits for third-party service providers (like bike rental) are straightforward:

- Increase user base and reduces user-acquisition cost as every IM user is a potential user
- Acquire higher activity as users can have better access to their services (IM Mini Apps in addition to its own client)
- Achieve a better user experience by integration of IM common capabilities, for example SSO for third-party application registration, logging-in and payment for third-party application.

3.4 Revenue Model

- Users pay for third-party services.
- Revenue share of users' payment
- Monetisation from auction of Mini Apps entry position in IM clients
- Monetary compensation of IM capability revocation

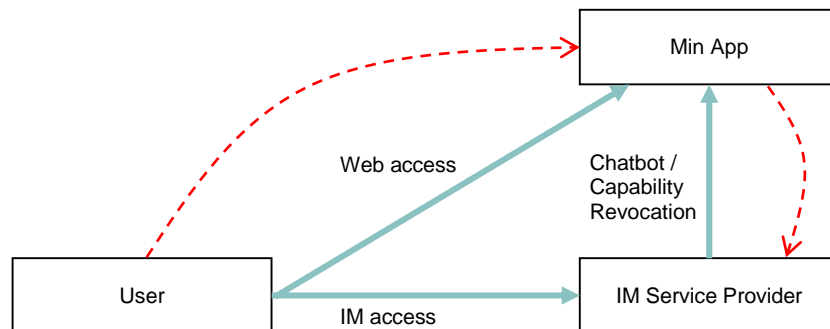


Figure 10: Web App Ecosystem

4. Service Description

This chapter presents examples of Mini App service design based on real implementation.

4.1 User Experience

4.1.1. Mini App Initiation

The following are possible initiation methods for Mini Apps:

- A Mini Apps field on the top of the messaging conversation list which opens the lists of Mini Apps.
- A Mini Apps field on the top of the contacts screen which opens the lists of Mini Apps.
- Mini Apps can be invoked from within the conversations. For example, a Chatbot or a person sends a URL link in a message, and the link redirects the user to the Mini App page.



Figure 11: Mini App on the conversation list

4.1.2. Mini App Home Page

There can be a Mini App homepage listing all Mini Apps. The user may access the page through SSO. The content and layout of the Mini App homepage can be customised according to the user's identity or preferences.

The Mini Apps can be clustered into different categories.

- Third-party Mini Apps
 - Enterprise Mini Apps: OA, HR, company email, company moments, etc
 - Standard Mini Apps that provide services to all users (subscribed or recommended): takeaway, e-banking, ticketing, music etc.
- A reserved area for the users to add or subscribe to more Mini Apps
- If a user's company does not have a Mini App, then the user only sees the standard Mini Apps on the homepage.
- If a user belongs to more than one company, then he/she can switch the homepage between different companies by tapping on the company's name on the top of the homepage.

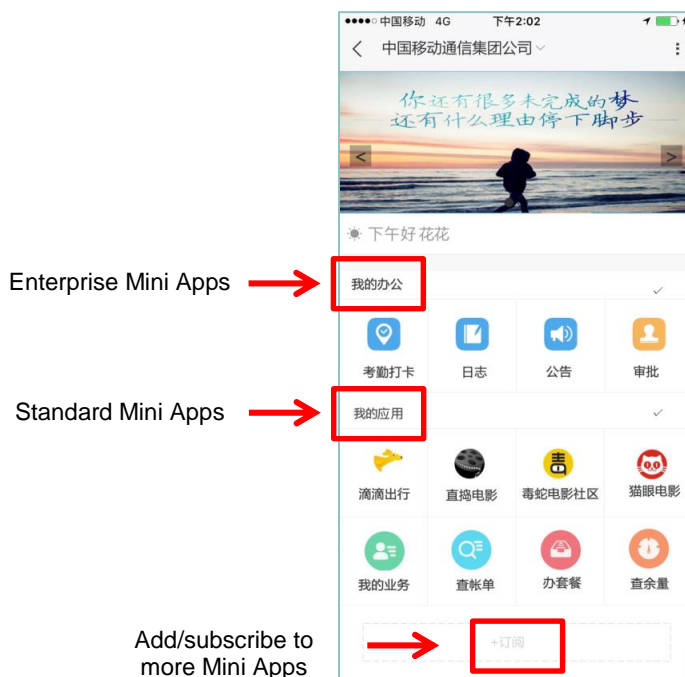


Figure 12: Mini App homepage

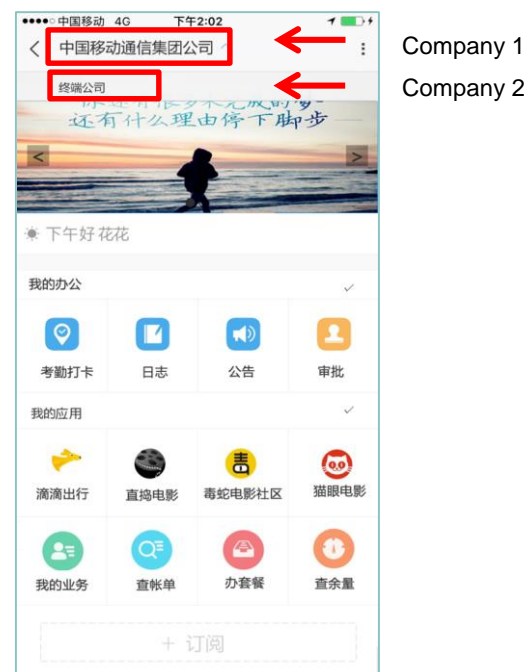


Figure 13: Switching between companies

4.1.3. SSO and Other Authorisation Mechanisms

SSO or OAuth can be used to facilitate the user authentication of Mini Apps. Selecting the Mini App on the homepage will redirect to the Mini App main page. The authorisation page will appear if user information is required.



Figure 14: Authorisation page

4.1.4. Application's Chatbot Messaging Interaction

An application also provides Chatbot messaging interaction. An application can send Chatbot messages to its users. Similarly, an enterprise's Chatbot can send messages to its employees, and an Internet application can send messages to its subscribers.

On an enterprise application's chat interface, a user can tap on an icon or a URL link to invoke this application's homepage.



Figure 15: Application's Chatbot messages interaction

4.1.5. Operations about an Application

A user can share or recommend a Mini App's contact information to another user, for example by tapping on the share button in a webpage.

A user can also examine a Mini App's detailed information, including service scope, its provider and developer.

A user can also make a complaint about the Mini App. The user simply taps the 'complaint' button and submits their comments to the operator.

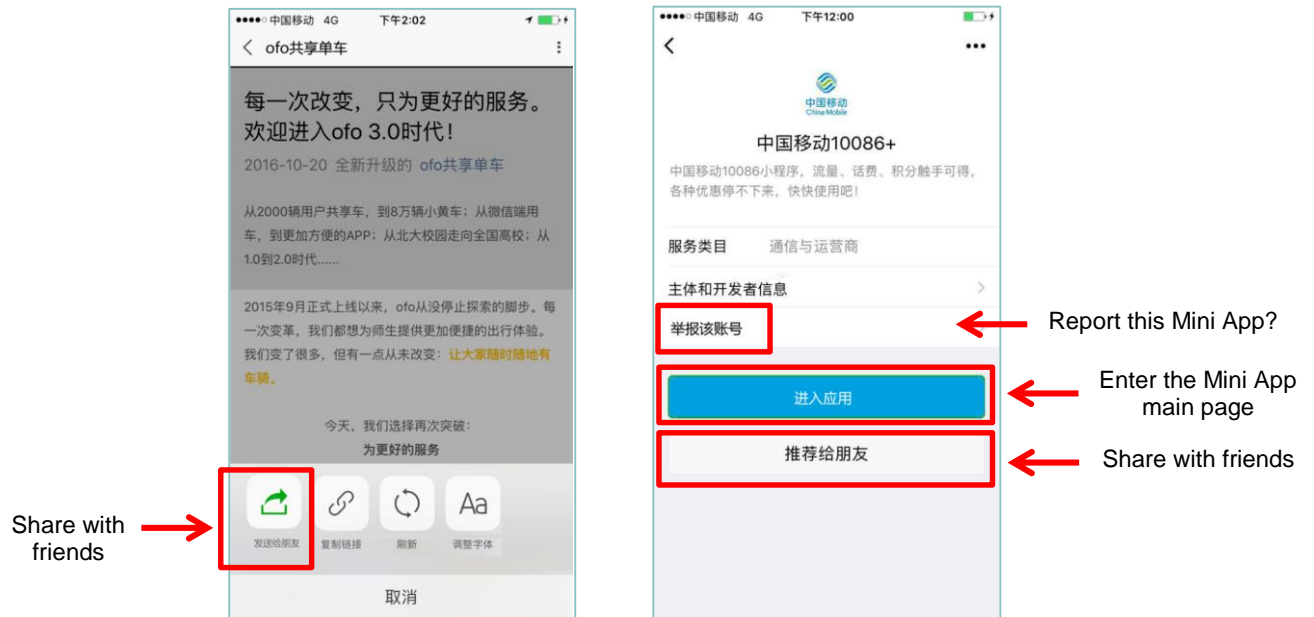


Figure 16: Application operations

4.1.6. Search for and Add Mini Apps

The users can search for new Mini Apps and add them to their Mini App homepage.

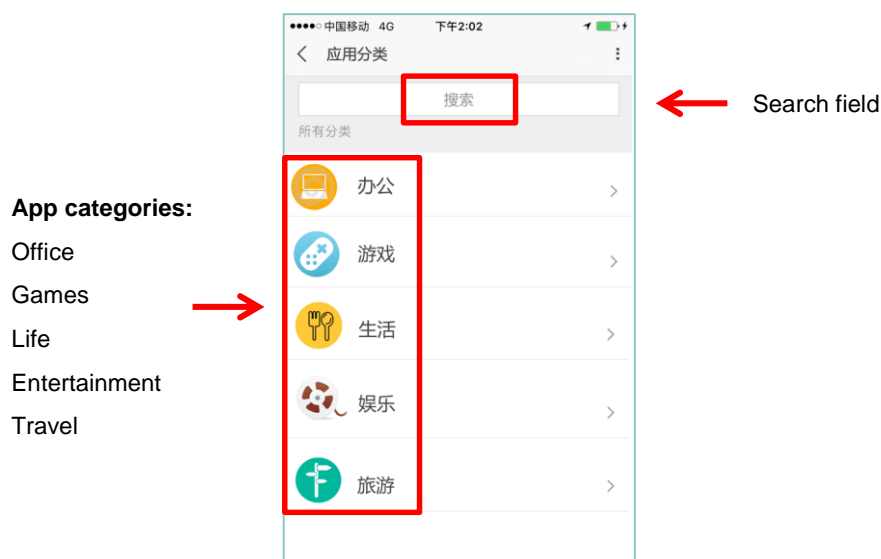


Figure 17: Mini App search interface

4.2 Third Party User Experience

Mini Apps can either be open to all users or limited to enterprise users. Enterprise Mini Apps can only be used by the employees of that enterprise.

Standard Mini Apps are submitted to the operator's Mini App Management platform with the Mini App information including name, logo, type, URL and description. The Mini App Management platform checks the information and tests the Mini App, then assigns an ID if it passes the tests. The Mini App Management platform checks the Mini App ID when a user accesses that Mini App.

Enterprise Mini Apps follow the same process as standard Mini Apps. Additionally, an Enterprise Mini App ID is assigned. The enterprise imports its employee list to the Mini App Management platform. The Mini App Management platform displays the chosen Mini Apps to the enterprise's employees on their Mini App main page according to their phone number.

4.3 High level Technical Architecture

There is a Mini App management module in the Bot Platform for the third party applications to access into the operator's Mini App service. The Mini App management module provides a Mini App homepage and maintains the user's subscription to the Mini App list.

Users can access the Mini App homepage on the messenger application. The user taps on the Mini App icon on the homepage and the http request to the Mini App is directed to the Mini App management module first. This module will authorise the request, ask the user if they will allow the application to obtain their personal information and then, with the user's permission, redirects the request to the third party system.

An application can also send Chatbot notifications to end users. For example, when a user books a ticket on an application webpage, they receive a notification containing detailed information about their ticket from the application's Chatbot.

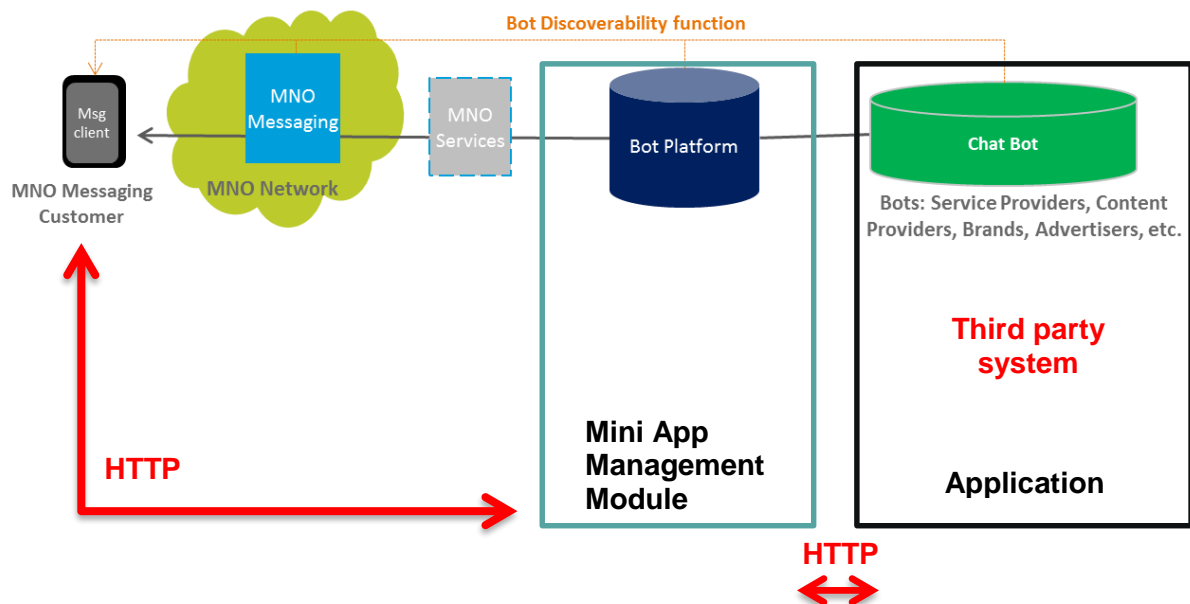


Figure 18: High level view of the Mini Apps within the MaaP ecosystem

5. Summary

The Mini App feature is a loosely coupled, beneficial extension to OTT IM or RCS/MaaP.

5.1 Advantages of Mini App

Due to HTML5 capabilities, Mini Apps are easy to develop, easy to incorporate into IM clients and are able to provide powerful local computations, networking and a friendly UE.

In addition:

- Complex human-machine interaction can be dealt with easily and clearly.
- Users do not need to download or install rarely used applications.
- User experience can be improved from IM capability invocation resulting from integration of the Mini App and IM.
- IM can acquire higher user activity, more data traffic, higher user loyalty, users' preference and profile description, and competitive advantages.
- Third-party service provider Mini Apps can expand userbases, increase data traffic and create a better user experience.

5.2 Applicable Scope

Mini Apps are ideal solutions for:

- Rarely-used, light-weighted mobile applications with focused functionality such as booking tickets or renting bikes.
- Compound mobile applications whose core functions can be extracted and packed into HTML5 based web applications, and then integrated into IM clients. This approach increases new user acquisition and extends the userbase.



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