



*"Linked Open Apps Ecosystem to open up innovation in smart cities"*

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### **Summary**

The success of the iCity project is strongly linked to its ability to identify, reach and engage the potential group of users of the iCity platform: developers, entrepreneurs, social innovators, SMEs, etc, who will act as developers of an ecosystem of services of public interest taking advantage of the opening of existing public infrastructures in the four participant cities. In this scenario, a good communication channel with final users becomes crucial.

This document is aimed at establishing a plan for guiding the definition and deployment of the Apps Store that the iCity project should develop to offer and to promote the apps developed over the platform.

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# 1. Introduction

## 1.1 Purpose of this document

The success of the iCity project will be mainly based on the ability of its partners to identify, reach and engage the potential users of the project's technical solution to create services of public interest. In this sense, an effective liaison between the project and its interested social stakeholders and final users is the key for the replication and rapid take-up of the iCity solution. The set-up of the appropriate communication channels should be carefully thought in order to create the more valuable tools.

This Apps Store definition provides orientation to the basic characteristics of the Apps Store and the next steps to go forward in its deployment. In this respect, this document intends to cover all development steps, from the correct approval process to the technical definition of the Apps Store and its success analysis. Therefore, it defines an overall approach for the deployment strategy in each city.

It is important to mention that this document will be alive and modified during the whole life of the project in order to adapt its contents to the final platform architecture, the approval procedure and the apps store strategy defined in each city.

## 1.2 Objectives

The iCity project is aimed at fostering the development of services in the urban space by third parties (developers, small and medium-sized enterprises...). The services will be created by opening existing infrastructures in the participant cities where existing networks will be made available and accessible to the general public. A shared technological platform will be created to allow the simultaneous use of the resources by both public and third party services.

An iCity Apps Store will be created as a communication channel with the final apps' users in order to make them available and to promote their use.

The **objectives** of the iCity Apps Store definition are the following:

- To give the project an appropriate showcase so that it becomes easily identifiable and reachable by interested users.
- To structure the Apps approval process to be developed and the commitment by both parts.
- To establish an appropriate ecosystem of tools to enable a growing community of users interested in public services using local infrastructures.
- To raise awareness on the project progress and activities among interested stakeholders and users.

## 2. Context and key messages<sup>1</sup>

iCity aims at integrating a common technological platform upon which services, designed and instantiated by interested user-driven open innovation ecosystems can be offered to the citizens throughout a City Open Apps Store. iCity will create a confident respectful relationship upon data and infrastructure provided by public administrations can be relied upon to build solid independent SMEs.

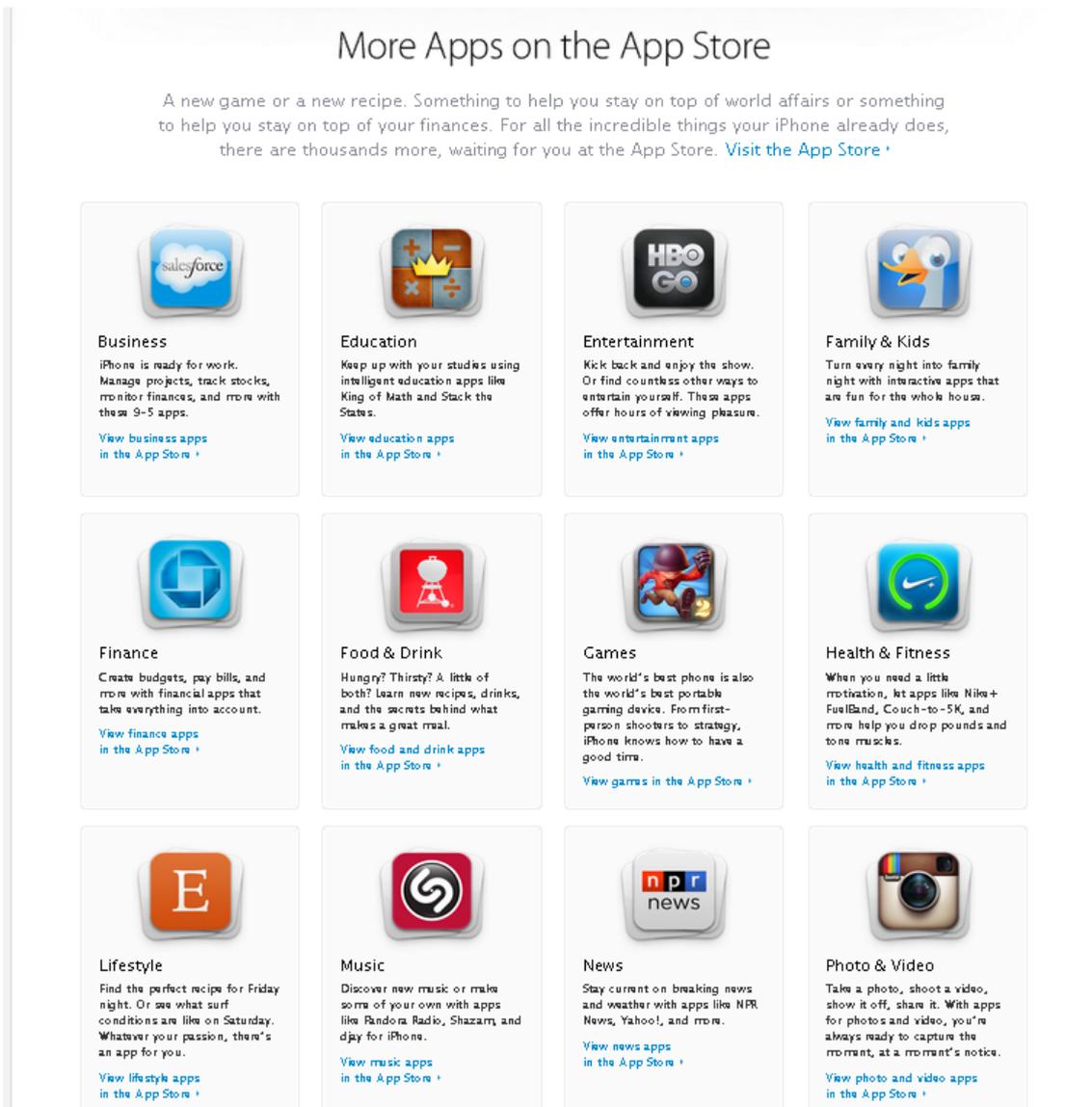
The iCity project intends to develop and deploy an operational approach to allow userdriven open innovation ecosystems to co-create, deploy, operate and exploit Internetenabled public services or services of public interest in the public urban space in smart cities.

The iCity project goes beyond a conventional Open Data project, creating an ecosystem aimed at generating and publishing applications, to allow sharing a part of the public city ICT infrastructure to generate new services of public interest, breaking entry barriers to the new services. This fact increases the iCity concept adoption of more interest groups and communities, ensuring the long-term viability.

The successful model of mobile application stores (AppleiOS, Google Android, Microsoft Windows Phone) are a great lesson on how to create a new market place for very light applications that give value to the consumer for a low price. On the other hand we saw the results from London experience and the success of transport information. The two experiences give us an idea of the potential of joining city applications, with city data and public interest services at the same market place, breaking the all existing paradigms and transforming the business models. The aim is to facilitate the creation of new relation models between public administrations, private companies and citizen and facilitate the sustainability of the ecosystem.

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<sup>1</sup> Information extracted from the DoW

Fig.1 Apple Apps Store<sup>2</sup>

## 2.1 iCity Platform

To enable innovative applications, we need to make sure that all the information that is available in the cities pervasive infrastructure can be used and correlated to other events that happen in the city. So, application developers can use the huge amount of hidden data that will also be enriched by the platform.

The iCity Platform is aiming at industrializing the operations and management of the city to offer scalable, secure and robust services to the citizens and companies. The platform will enable innovation, integration and monetization of home and third party developed services.

<sup>2</sup><http://www.apple.com/iphone/from-the-app-store/>

The iCity Platform is a combination of human and technical interactions through Governance, Business Processes and Standardization of best practices and the use of Open Data, as we strongly believe that it can't be just about technology.

On the technical side, the foundation is the network as the platform that already offers many services (for example location based services, authentication, and authorization) and the iCity Platform that is the glue between the different functional layers allowing deploying, managing, innovating and monetizing the services/business.

The project will implement a Digital Urban Service Delivery Platform based upon an integrated and extended adaptation of the platforms already existing in the involved cities. The platform will be based upon open standards and be made available to any other city or regional instance that could be interested in joining the project vision during and beyond the phase to be funded. Apps instantiating services of public interest will be made available to the citizenship on an iCity Apps Store.

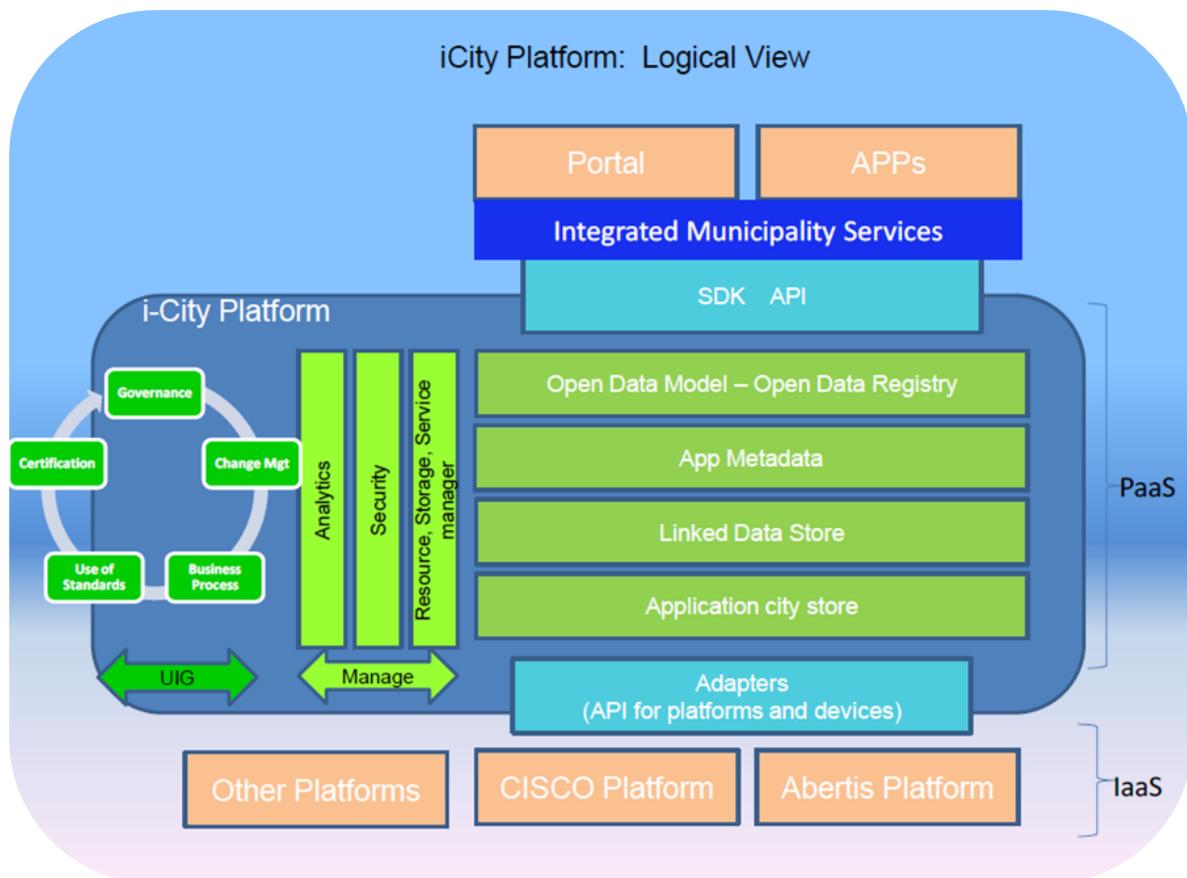


Fig. 2iCity Platform: Logical view

## 2.2 Prioritisation of services

As already pointed out, the chosen approach on boosting the involvement of open innovation ecosystems interested in developing, deploying and supporting services of public interest will open an interesting and at the same time challenging alternative to conventional prioritisation of services. The dynamics driven by both citizenship, open innovation ecosystems and local agents of innovation will allow for a "natural" response to city needs, which will be mapped against default priorities as established by each city. What is considered as important, and

that will not prevent each city to make explicit their own priorities in terms of service areas, is that maximum freedom should be granted to open innovation ecosystems to be able to propose to the consideration of local public administrations those services of public interest they consider as appropriate. The response to their availability will also provide important guidance to further developments, as well as to further enhancements of public infrastructure or functionalities of the iCity Platform.

Although the Cities have made a preliminary identification of their key areas, the project has opted for understanding from practice what are going to be really the main needs, functionalities and services that should be boosted to its maximum, in order to adequately cope with the needs of the city as a whole. The success of the approach will act as an additional argument for other cities and key stakeholders to join the deployment of the iCity Platform, to which access rights will be given under open and shared-based conditions.

### 2.3 Engaging Open Innovation Ecosystems with users

The activation and engagement of open innovation ecosystems and users in each of the involved cities will rely upon the basis of a structure that will transfer into value the experience and lessons learnt from the exercises carried out by Living Labs and the deployment of related experimental facilities like Urban Labs and Fab Labs.

In this respect, the project has defined a five-steps approach intended to drive the overall process of securing the final co-creation exercise, which will be composed and structured as follows:

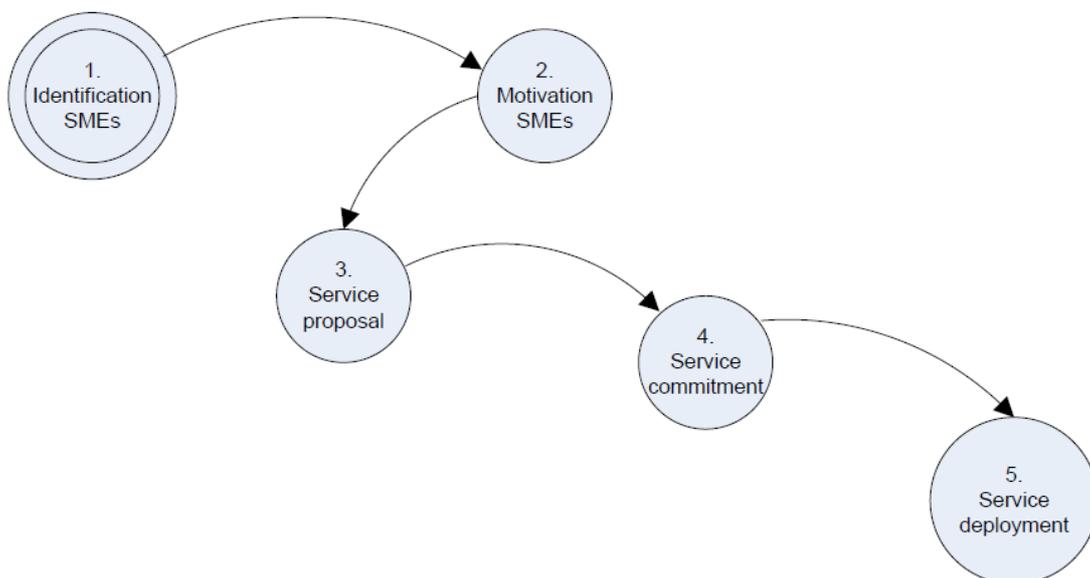


Fig. 3 Phases of the service deployment process

- Phase 1: Identification of open innovation stakeholders. Intended to exhaustively identify and explore the nature and characteristics of open innovation ecosystems and more precisely existing SME communities that could eventually become interested (or be considered as interesting from the project's perspective) to get involved in the co creation of services of public interest in each of the involved cities. This phase will rely upon the collaboration and active involvement of local agents of innovation, with whom each of the local Cities' Governance Bodies will establish a

sustained interaction. Joint activities will allow establishing contact and exchange of information and knowledge with innovative SMEs in all identified open innovation ecosystems.

- Phase 2: Motivation of open innovation stakeholders. Aimed at incorporating the stakeholders identified in the previous phase into the activities of the project, at least joining the Special Interest Group. Involved organisations will be invited to start considering submitting proposals for the cocreation of services of public interest, to be analysed and eventually accepted at the next phase. The organisation will be invited to apply involving already committed users/citizens or to specifically request whether they will need cities' support in this respect. The interested parties will be provided with specific details on conditions and regulations applicable to the approval procedure.
- Phase 3: Service proposal approval. The received proposals for the co-creation of services of public services will be examined by a committee composed of representatives of the project and of representatives of the targeted cities (local Cities' Governance Bodies).

The appropriate authorities of the city councils must give approval of the service to be developed both from the perspective that it can be considered a service of public interest as from the perspective of the feasibility of the use of data and infrastructure in the chosen urban areas.

- Phase 4: Service commitment. All approved proposals for the co-creation of services of public interest will be formally approved and a bilateral agreement established and signed between the interested stakeholder and the representative of the local Cities' Governance Body (on behalf of the project). The agreement will specifically address all parties' duties and rights, and will specifically define the kind of support and exchange and share of information needed for the purposes of the project activities.
- Phase 5: Service deployment. All approved services of public interest will be jointly organized as components of the pilots in the targeted cities, and specific support and guidance will be provided to the deployment of those services. Access to the Urban Lab facilities and SDK will be granted in order to allow for the development, testing and deployment of the approved service of public interest. The apps instantiating the above-mentioned services of public interest will be incorporated and be made publicly available at the iCity Apps Store.

As it can be seen, the involvement of local innovation agents is considered as an important catalyser of the overall approach, as it will help facilitating the broadest and more accurate identification and activation of open innovation ecosystems (it's all about knowing them, and also knowing how to motivate them, and in this respect "assisted-contact" will certainly speed up and boost the process and involving the broadest as possible community).

### 3. Previous definitions

Because of the breadth of the subject we are dealing with, it is important to carefully analyse some concepts and determine the point of view from which we will work, both through this document and the development process.

#### 3.1 What is an iCity app

Nowadays there are available many apps stores like the cases of Apple's Apps Store, or Google's Play Apps Store or Microsoft's Windows Apps Store. These are digital distribution platforms that are intended to provide lists of software to mobile devices. Depending on the application, they are available either for free or at a cost.

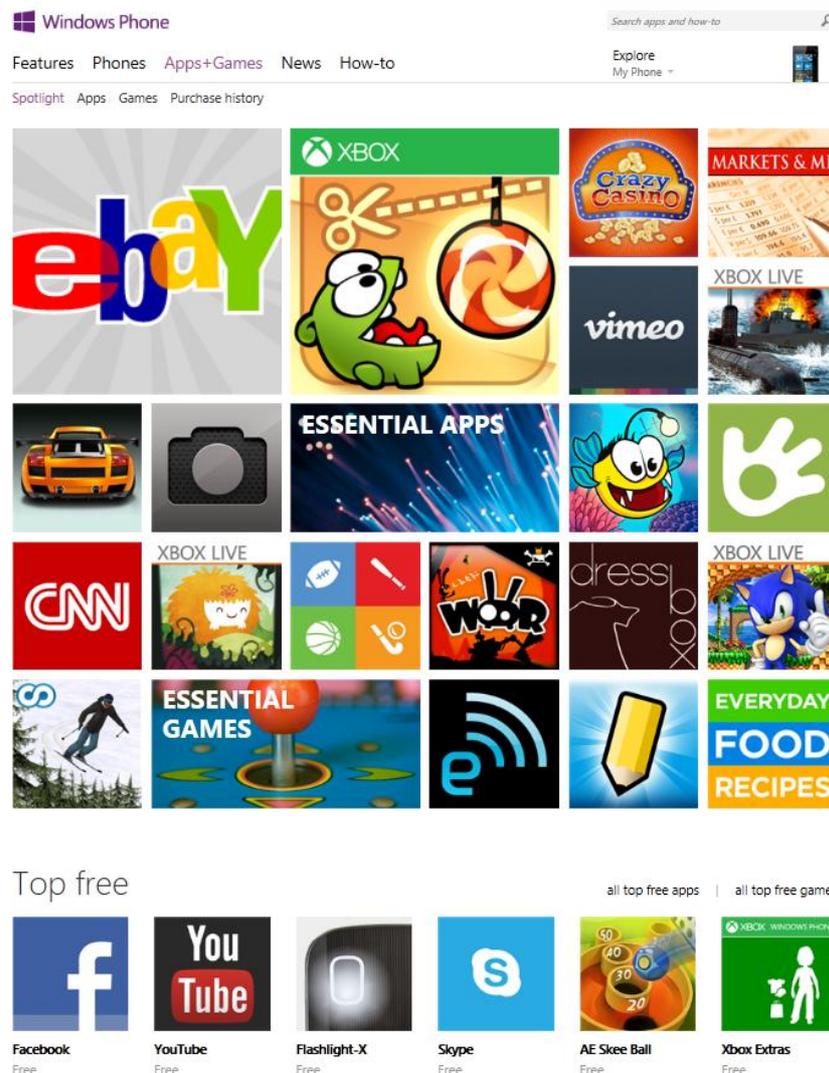


Fig. 4 Windows Phone Apps Store<sup>3</sup>

<sup>3</sup><http://www.windowsphone.com/en-us/store>

Although there are apps stores for many devices, they are usually known as the stores for mobile devices (mobile telephones, tablets, etc). This is not the case of iCity Apps Store.

In our case, an app is considered an application of a service that uses, at least, one open iCity infrastructure. Therefore, an iCity app is an implementation of a service of public interest that feeds of iCity functionalities and its opened public infrastructures, so they aren't only for mobile devices.

All the iCity apps must pass the iCity Certification Process in order to be an iCity App (and, to be published in the iCity Apps Store). This certification process is explained in section 6.

On the other hand, the iCity Apps Store will be a place to publish all the iCity services created by third parties.

In addition, the apps that are obsolete (no longer operational) will keep in the iCity Apps Store as historical information. The iCity Apps Store must be the place to know all the iCity apps, the current and the historical apps.

### 3.2 Which are the metadata of an app

Every iCity app is defined by a set of metadata. This information will be provided by the app developer when starting the iCity certification process (please refer to section 6 of this document) and reviewed later if necessary. This is important because before an app is published (and downloadable), its compliance with the iCity platform rules needs to be verified in three main areas: city strategy, legal aspects and also technical questions.

In addition, these meta information is also very important in order to have good search engine service.

The meta information of each iCity app should be:

- Service name.
- Short description.
- Size (in Kb).
- Images (logo + screen captures).
- Owner/Developer.
- Last version available, Date
- Language
- User license.
- Which infrastructures are to be used?
- Cost, if any?
  - If so, what does it cost?
- Final devices:
  - Mobile: which OS? Google Android, Apple iOS, Symbian, Microsoft Windows Phone, etc...
  - Web: Supported browsers
  - Tablet
- To which city is it aimed for?
- Mapping (entire city, a district, a particular neighbourhood, a street, a particular point, etc).
- Which is the topic?

- QR code or Link to directly download the app
- Score that users give\*
- Users' comments\*

\* These two blocks of information are results of the natural use of the Apps Store and feed by users, so will be a part of the app's metadata when it is available Apps Store.

## 4. iCity Apps Store

iCity Apps Store must become the communication channel with the end user and will be essential for the proper use of the iCity platform as it must bring together all the applications carried out under the project.

So iCity Apps Store should be a top quality communication channel, usable and friendly, allowing users to get all the information required and retain them.

Given that the main consideration is that the iCity Apps Store will be in web format, some real portals have been visited as examples that inspire us during development.

As an example we can cite the Berlin Open Data website, which includes applications and mashups with information about the city or visit the Gov Apps site, an Apps Store with mobile applications for German administration, which includes many interesting search items.

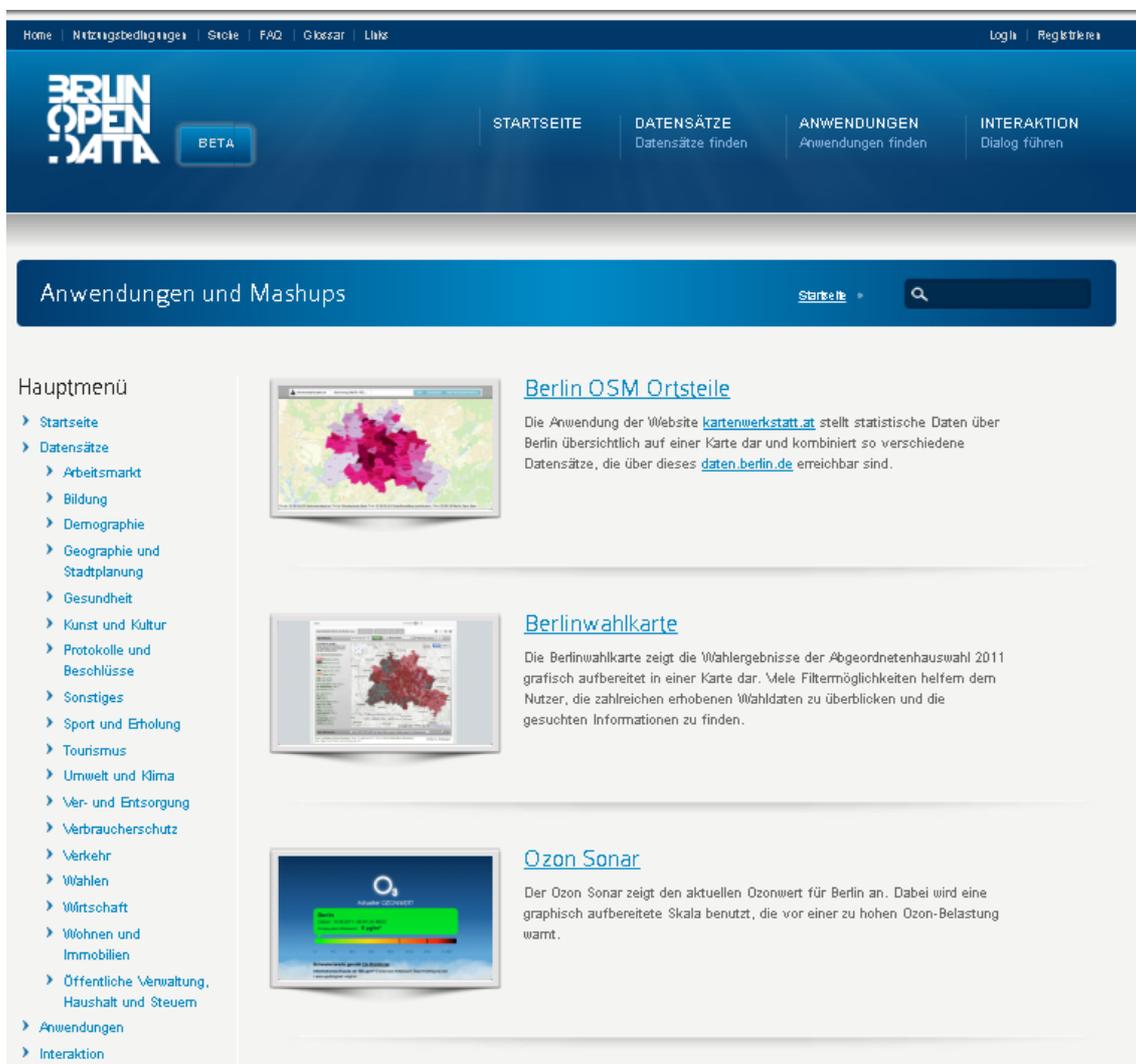
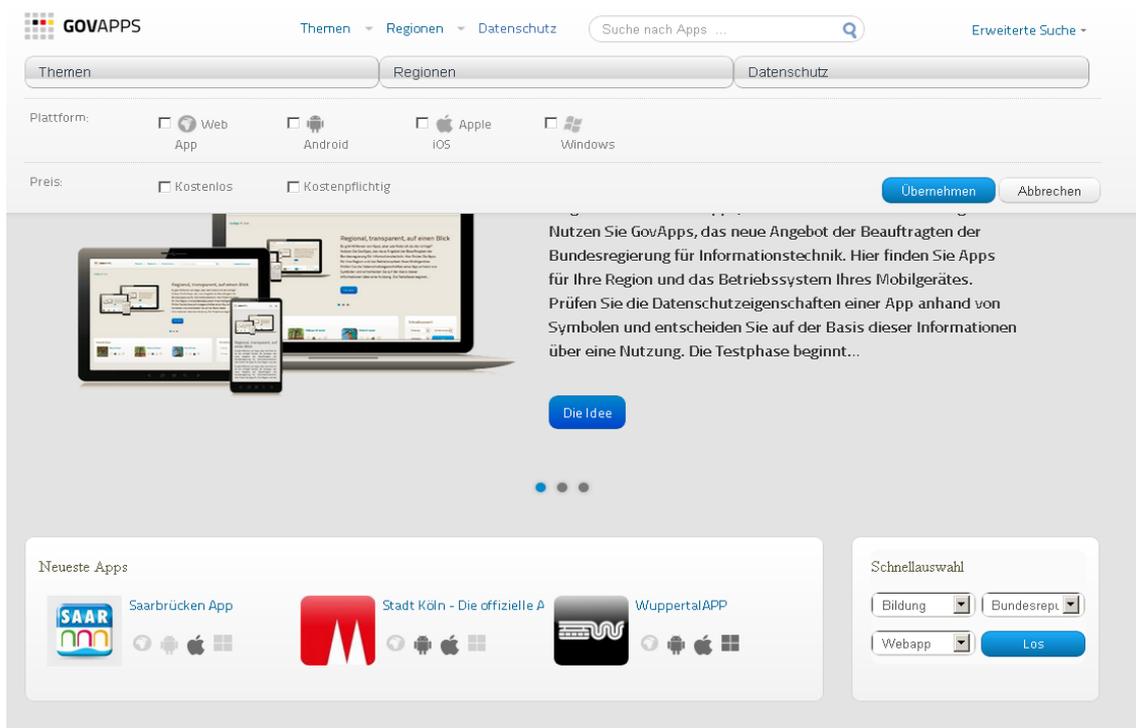


Fig. 5 Berlin Open Data<sup>4</sup>

<sup>4</sup><http://daten.berlin.de/anwendungen>

Fig. 6 Gov Apps<sup>5</sup>

## 4.1 Technical vision of iCity Apps Store

The main purpose of iCity Apps Store is advertising the services created thanks to, at least, one open infrastructure and facilitate their use and download. In fact, the very process of certification of an app is in all cases the release of this app in the iCityApps Store.

The iCity Apps Store is an iCity Project service consisting of two elements:

- iCity Apps Showcase.
- iCity Apps Hosting.

### 4.1.1 iCity Apps Showcase

The iCity Apps Showcase is the front-end of the iCity Apps Store, essentially a website with a list of all the applications using open infrastructure's services via iCity Platform.

iCity applications are strongly linked with the cities' strategy, infrastructure, data and local language(s). So, there should be one instance of iCity Apps Showcase for each city, so cities could manage locally "their" iCity applications.

<sup>5</sup><http://www.govapps.de/start>

Specifically, the proposed flow through the website of the iCity Apps Showcase is:

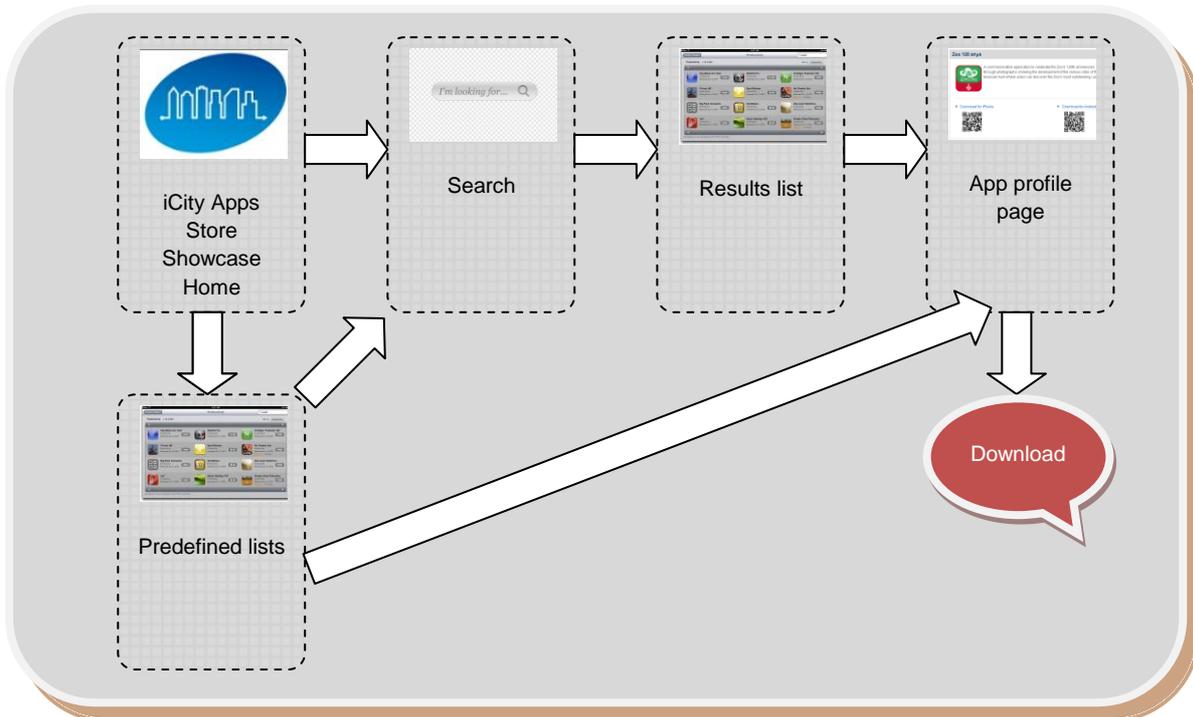


Fig. 7Flow of the web pages of a iCity Apps Showcase

The main functionalities of the iCity Apps Showcase are:

- It is where will be published all the service applications created by third parties.
- Applications can be downloaded by end users (based on the app's user management).
- Will provide a search engine based on different application's characteristics (meta information detailed in section 3.2).
- Every app will have a profile with a unique URL identification that can be reached individually.

But there are some advanced functionalities that the Apps Showcase should comply with in order to be more usable and friendly:

- Apps' Rankings based on this metadata (for example, most used apps, etc).
- Allows ratings and reviews submitted by users. Possibility that the developer can respond to the comments.
- Connecting with social networks, in particular, should allow a Facebook "I Like" for an app, or sending a Twitter message linking the information page of each app.

Therefore, iCity will provide each city the channel (code or web service) that allows them to connect to the platform and create "their" iCity Apps Showcase with the required look and feel for each city, or even adding it in to other existing web products.

#### 4.1.2 iCity Apps Hosting

The other element of the iCity Apps Store is the iCity Apps Hosting that is basically the storage applications' component. The main features of the iCity Apps Hosting are:

- Storage of the applications developed under the iCity project. (As explained in section 6, this storage will be done automatically as the last step of the certification process of an app).
- Responds to requests for information from the iCity Apps Showcase, therefore acts as an information server about each app.
- Keeps the information for each app (the metadata detailed in section 3.2).
- Manages information updates when needed (for example, when receiving a new comment from a user).
- Provides indicators on the use of apps. These indicators will be sent to the apps' owners and also to the iCity referents for each city or partner in order to know and evaluate the indicators performance set in the project.

There will be only one iCity Apps Hosting and it will be a service of the iCity Platform, so it will serve at the 4 iCity Apps Showcase.

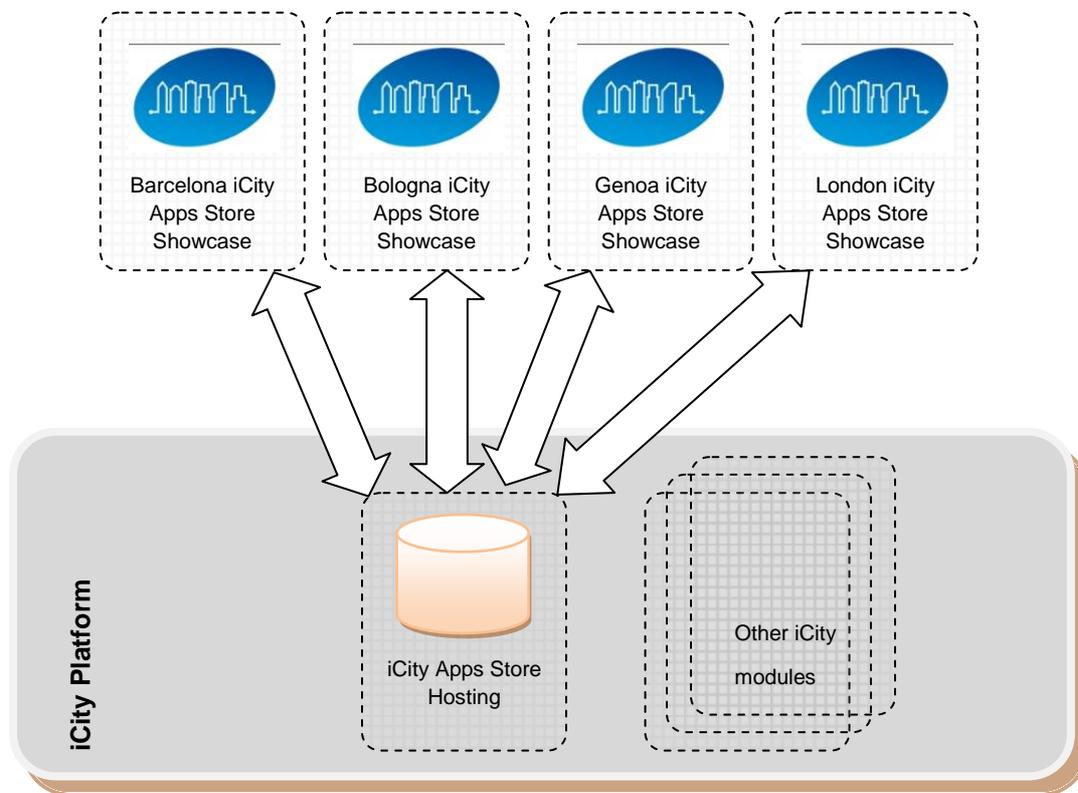


Fig. 8 Relationship between iCity Apps Showcases and iCity Apps Hosting

In the section "Future developments" there are specific improvements of the iCity Apps Showcase, like the possibility to evolve from a website to a mobile app specific for major mobile devices. This will approach the iCity Apps Showcase to those environments already known by the mobile devices' users, such as Apple iPhone Apps Store or Google Play Apps Store.

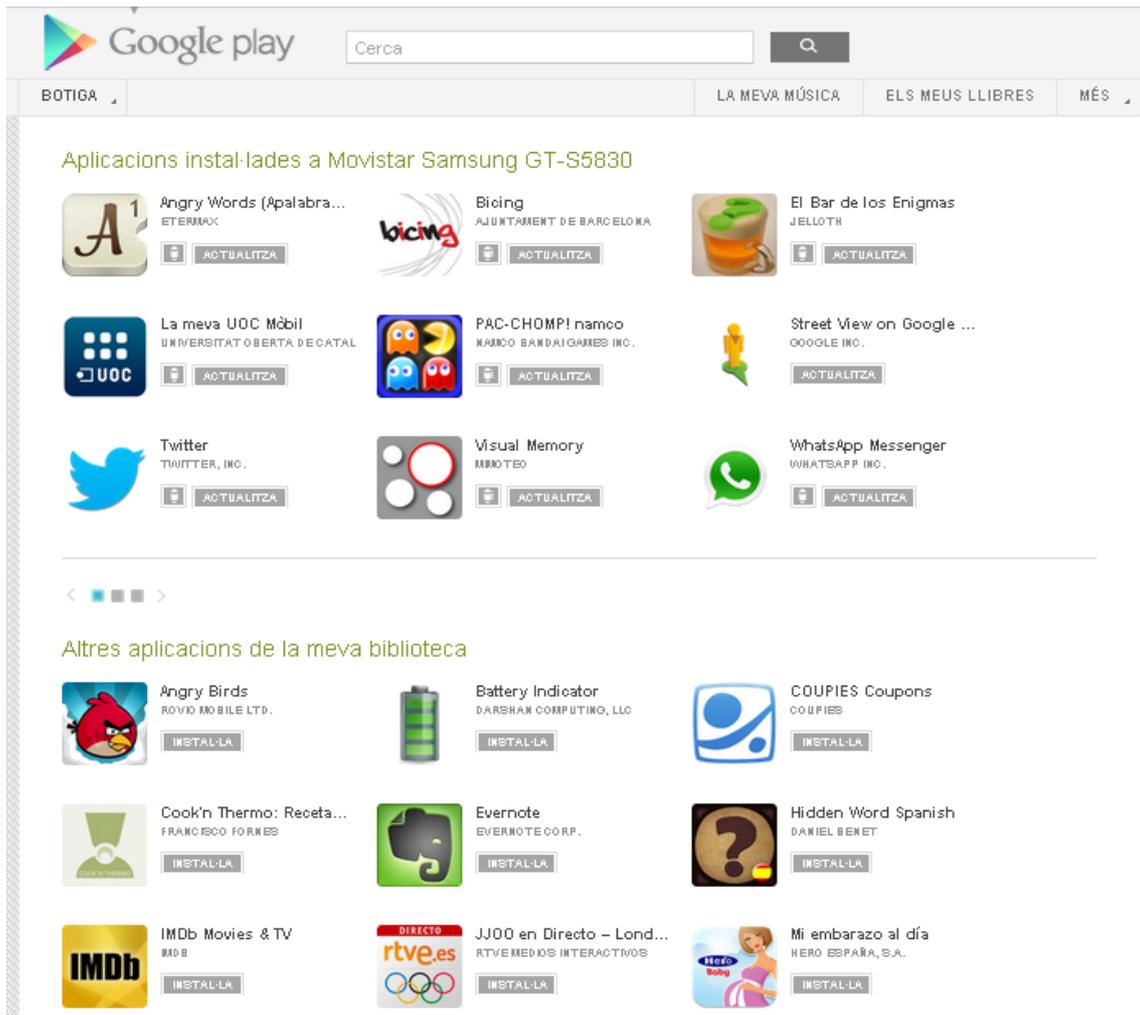


Fig. 9 Google Play Apps Store on-line<sup>6</sup>



Fig. 10 Google Play Mobile Apps Store

<sup>6</sup><https://play.google.com/store/> (Google Play it is formerly known as the Android Market)

## 4.2 Search engine

One of the key functions of the iCity Apps Showcase is the search engine. It is important to have a powerful one in order to facilitate the apps searching.

According to the metadata of each app (see the 3.2 section) users might be able to search apps by a single or a mix of this information:

- “Free text” (searching in these fields: App name, owner/developer, short description, and users’ comments).
- Which is the topic?
- Which open infrastructure is used?
- Size (in Kb) (range).
- Cost(range).
- What is the technological platform of this app? (Google Android, Apple iOS, Microsoft Windows Phone, Web Browsers, Java, etc).
- Georeferencing.
- Users score.
- Users downloads (downloads only in iCity Apps Showcase).
- App uses (from iCity accounting functionality).

## 4.3 User management

The user management in the iCity Apps Store is simple as there are two kind of users.

- (1) **City User:** this user will connect every iCity Apps Showcase with the iCity Apps Hosting, there will be a City User for each city. So, these users will be technical users with a high level of security because they can modify any data.
- (2) **Statistics User:** this user will have permission only to consult indicators, so these users will have a low level of security; there will be a Statistics User for each city.

As it’s explained at section 6, an app will be added at iCity Apps Store when it passes a certification process. The last step of this process is the app addition in the Apps Store, so, the owner/developer doesn’t need a specific user for upload apps.

When the developer passes an app certification process, the owner will receive an identification for the app (in that specific version). This identification will validate the app when accessing to the platform, checking its permission to access and which are its use limitations. With this identification the developer/owner can authenticate in the iCity Apps Showcase in order to respond user comments.

No more users are needed in the iCity Apps Store; in fact, the apps’ users can rate without register.

## 5. City strategies

The first step to define the deployment strategy for the iCity Apps Store is to analyse which is the actual situation in each city and which is their future communication strategy in order to fit the Apps Store. This information about cities has been collected and is stated below.

A deeper analysis must be carried out either in term of cities strategy evolution or in technical aspects when the platform is fully defined

### 5.1 Cities previous experiences and further strategy

#### 5.1.1 Barcelona

Barcelona has nowadays a site where citizens can get information and download mobile apps with city information developed by the municipality([www.bcn.cat/bcnmobil](http://www.bcn.cat/bcnmobil)).

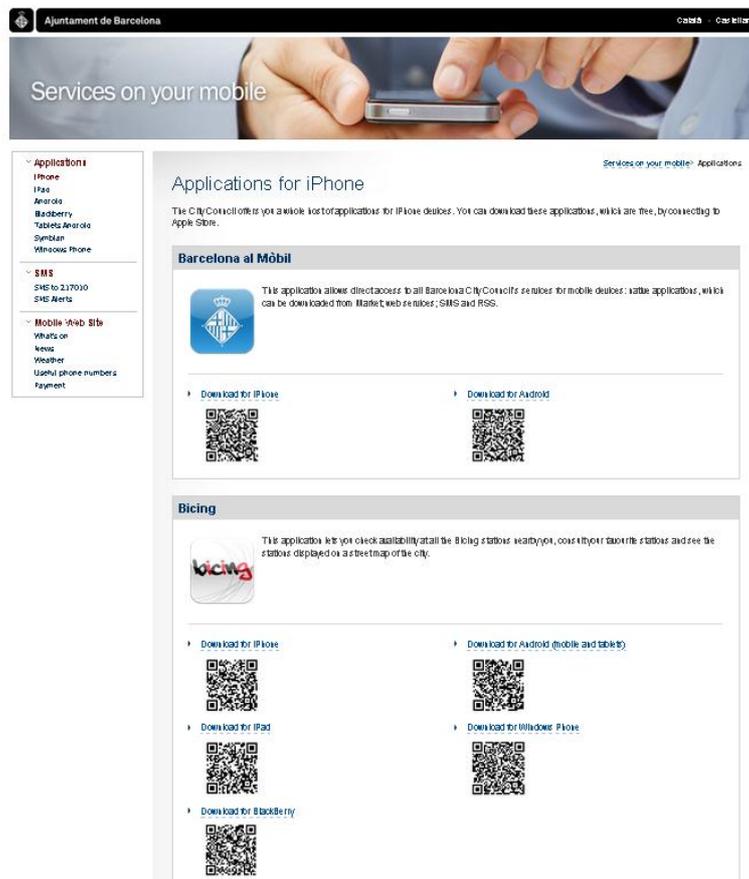


Fig. 11 Barcelona actual site for Mobile services<sup>7</sup>

<sup>7</sup>[http://w110.bcn.cat/portal/site/Mobil/menuitem.39ee81df0abf91b0a042a042a2ef8a0c/?vgnextoid=dec7ebcae47f4310VgnVCM10000074fea8c0RCRD&vgnnextchannel=dec7ebcae47f4310VgnVCM10000074fea8c0RCRD&lang=en\\_GB](http://w110.bcn.cat/portal/site/Mobil/menuitem.39ee81df0abf91b0a042a042a2ef8a0c/?vgnextoid=dec7ebcae47f4310VgnVCM10000074fea8c0RCRD&vgnnextchannel=dec7ebcae47f4310VgnVCM10000074fea8c0RCRD&lang=en_GB)

This website gives information about all the services that the Council offers to the citizens for their use on mobile phones. 4 different services are offered:

- Mobile apps to be downloaded from markets, depending on the platform: iPhone, Android, Windows Phone and Blackberry.
- Web apps specifically adapted for mobile phones accessible from the mobile's browser
- SMS services through the 217010 number
- SMS alerts sent for free, depending on the subscribed service.

There is also information of new developments and the main news about mobile technology.

Barcelona is working on an Apps Showcase at city level that brings together all the apps with city information regardless of who is the owner or whether the app is hosted and would permit creation of experts lists, rating, voting, etc.

The scope that this project wants to cover is:

- Creating a catalogue of apps in representative categories of topics interesting most users
- Create a group of experts in each category that will select relevant apps in its category and tags.
- Add the City Council as an expert, publishing its list of recommended apps.
- Allow users to actively participate in making apps' assessments.

Presumptively, iCity could be added as an expert creating the iCity list. It is an interesting experience to share and can be easily introduced in other cities.

It's still pending to analyse the project viability and how could it comply with iCity Apps Store's needs

### **5.1.2 Bologna**

Bologna, as a Municipality, doesn't have an Apps Store / Apps Showcase at the moment, but they are evaluating some solutions proposed by local SME's.

In particular one of these (Bazaar by Epocaricerca Srl) seems to fit well with the iCity project needs. The needs considered to be covered by this solution are:

- It is about an application that acts as a "container" of apps available in the market.
- It does not depend of the device (Apple iOS, Google Android, Windows Phone).
- The Apps available are both web-apps or native apps from official stores

It's still pending to clarify if this solution is feasible and compatible with the iCity platform.

### **5.1.3 Genoa**

Genoa municipality has nowadays available the Apps Point, an Apps Showcase where citizens can download mobile apps with city information developed by the Municipality or stakeholders. Apps available are either web-apps or native apps from official stores.

Home Mappa Sito Cerca Entra 



**HOME**

**GENOVA SMART CITY**

**ASSOCIAZIONE GENOVA SMART CITY**

**I PROGETTI**

**SMART IDEAS**

**Contest**

**Apps point**

**SMARTLOAD**

**CONTATTI**

**CLICKGENOVA**

**SMART WORLD**

**SMART KIDS**

**MULTIMEDIA**

**APPS POINT**

*Apps & happy*

*Utili e divertenti, applicazioni per semplificare la vita in città.*

La città intelligente ci permette di **raccogliere** un numero di **informazioni** prima impensabili. Queste possono essere trasformate in **risposte utili** da e per i cittadini e l'amministrazione.

Il gigantesco mondo delle **apps urbane** è la risposta lampante di questa **trasformazione**.

**AMTmobile**

Naviga liberamente e gratuitamente a Genova: scarica l'app gratuita per iPhone e iPad Free WiFi Genova. A breve disponibile anche per Android.



Mappa Sito | Versione stampabile | ©2011 - 2012 Comune di Genova | Powered by mojoPortal | XHTML 1.0 | Designed by Softeco Sismat S.r.l.

Fig. 12 Genoa Apps Point<sup>8</sup>

Regarding to the collection of further information (owner, evaluation, voting, etc.), it is referred exclusively to the data contained in Apple and Android Store.

iCity project is considered as good opportunity to develop a new model of their Apps Store, especially considering the growing number of apps that are developed.

#### 5.1.4 London

London is at the forefront of the open data movement, working in partnership with its cross-functional bodies (transport, police, health and social services). It has liberated many high value datasets that have stimulated both innovation and economic activity in the software development market.

A range of third party applications/services exist across a wide array of services exist on multiple platforms including the web, Apple and Android. Real-time applications already existing to improve their lives based on varied levels of open access to data and infrastructure include: Fix My Street, My Council Services, Speak Up, Cycle Hire, Get me There Now, Love Clean Cities and Tube Radar.

<sup>8</sup><http://www.genovasmartcity.it/apps-point.aspx>

The screenshot shows the London DataStore website. At the top, there's a search bar and an RSS feed icon. The left sidebar contains a 'London Dashboard' and a 'Datastore' menu with options like 'Databases', 'Catalogue', and 'Organisations'. The main content area features a map of London with a text overlay: 'What are well-being levels like in your neighbourhood? Check out the scores for 2012'. Below the map is a 'Welcome to the London Datastore' section with introductory text and a 'Join the mailing list' button. A 'Latest blog entry' section highlights 'London Ward Well-Being Scores - 2012'. The 'Featured Applications' section lists various data visualizations. The footer contains organizational information and the Mayor of London logo.

Fig. 13 London DataStore<sup>9</sup>

<sup>9</sup><http://data.london.gov.uk/datastore>

London has a huge experience in managing their DataStore. Published in their London DataStore site there are inspirational uses where are shown apps and visualisations created from the public data. This Apps Showcase, permits downloading the applications using either the Apple or Android store and permits citizens to rate them but doesn't track all the data users.

For future actions, London is currently considering having an app garden created by Transport for London.

The screenshot shows the London DataStore website interface. The main content area is titled "Inspirational Uses" and contains several articles:

- Custom Age Tool for ONS Mid-Year Population Estimates**: An Excel Age-Range creator for Office for National Statistics (ONS) Mid-year population estimates (MYE) covering each year between 1999 and 2011. It includes a screenshot of an Excel spreadsheet with columns for Area Cd, Year, Area name, Male, and Female. A table below shows population data for various London areas from 1999 to 2010.
- The London Jigsaw App**: A dazzling new app for iPhone and iPad plays with London's geography in ways that'll leave you gasping with delight. London Jigsaw scrambles up the prominent features of the capital; it's your job to drag them back to their appropriate locations.
- Free Data Visualisation Tool from the GLA**: Do you have a number of different datasets that you would like to get an overall picture of what they're telling you but don't have the time or Excel skills to do it? With data becoming both more central to a wide variety of roles, and also more widely available, assistance is often required to instantly get a feel for what a number of datasets of interests show. The GLA Multi-Dataset Index Tool allows you to do this.

Other visible elements include a sidebar with navigation links like "London Dashboard", "Dataset", and "Inspirational Uses", and a right-hand sidebar with sections for "Join the mailing list", "Latest blog entry", "Twitter", "Featured Applications", and "Join the conversation".

Area Cd	Year	Area name	Male	Female	Person
E03000001	1999	City of London	3,571	3,239	6,810
E03000001	2000	City of London	3,715	3,275	7,004
E03000001	2001	City of London	3,984	3,489	7,359
E03000001	2002	City of London	4,362	3,689	7,851
E03000001	2003	City of London	4,283	3,536	7,895
E03000001	2004	City of London	4,473	3,797	8,276
E03000001	2005	City of London	4,672	3,978	8,650
E03000001	2006	City of London	5,105	4,305	9,410
E03000001	2007	City of London	5,126	4,766	10,434
E03000001	2008	City of London	6,183	5,141	11,320
E03000001	2009	City of London	6,231	5,750	11,417
E03000001	2010	City of London	6,336	5,281	11,677
E03000002	1999	Barking and Dagenham	78,266	84,378	162,444

Fig. 14 London Inspirational uses<sup>10</sup>

<sup>10</sup><http://data.london.gov.uk/datastore/inspirational-uses>

## 6. App certification process

Publishing an application in the Apps Store probably has some trust, technical and even legal consequences. So, an app certification process must be mandatory in the iCity project.

We assumed in WP3 that the Application verification (before an App is downloadable, we need to verify it's compliant with the iCity platform rules, city strategy, legal and also technical) is a critical part of the iCity platform.

It isn't the purpose of this paper to explain this certification process for apps that use open infrastructures within the project iCity. But we need to define the basis of how this process will be in order to understand how will be the addition of an app in the iCity Apps Store.

This process (it is mandatory and free of cost) has 4 main steps:

1. **The petition:** The developer (the third party organization) makes a petition in order to create a new service using iCity platform. This petition contains meta-information about the service proposal (see 3.2), specifically the city where the new service will run.
2. **City approval:** The city (where this new service will run) has to check if this new service "matches" the city strategy. If the result is "not valid" then the developer has to modify the petition.
3. **Legal approval:** Obviously, the petition has to be law-abiding. So, once the petition has passed the city strategy checkpoint, then it will be tested in legally aspects. Again, if the result is "not valid" then the developer has to modify the petition in order to make it fit to the legal framework.
4. **Technical approval:** This step could have several "loops". The first one is to ensure that the petition "matches" the technical aspects prior to development. If the result is "not valid", then the developer has to modify the petition only the technical aspects. If the modification includes more than technical aspects, then the process goes back to step 2.
5. **Technical approval, (last loop):** The petition – now it's a real development – has passed the technical approval. Automatically it will be added in the iCity Apps Store (according to meta-information of the petition). As explained in risks section (8), a deeper analysis must be carried out in order to define how to identify a certificate app.

This is the basic definition of the certification process for a new app, in the case of an upgrade of pre-existing app, then could be only a single loop of technical approval or all process, it depends on how deep the changes are.

On the other hand, an opened issue is to make a conditions list that all apps must fulfil; for instance, if the app contains or displays pornographic material.

App certification process schema:

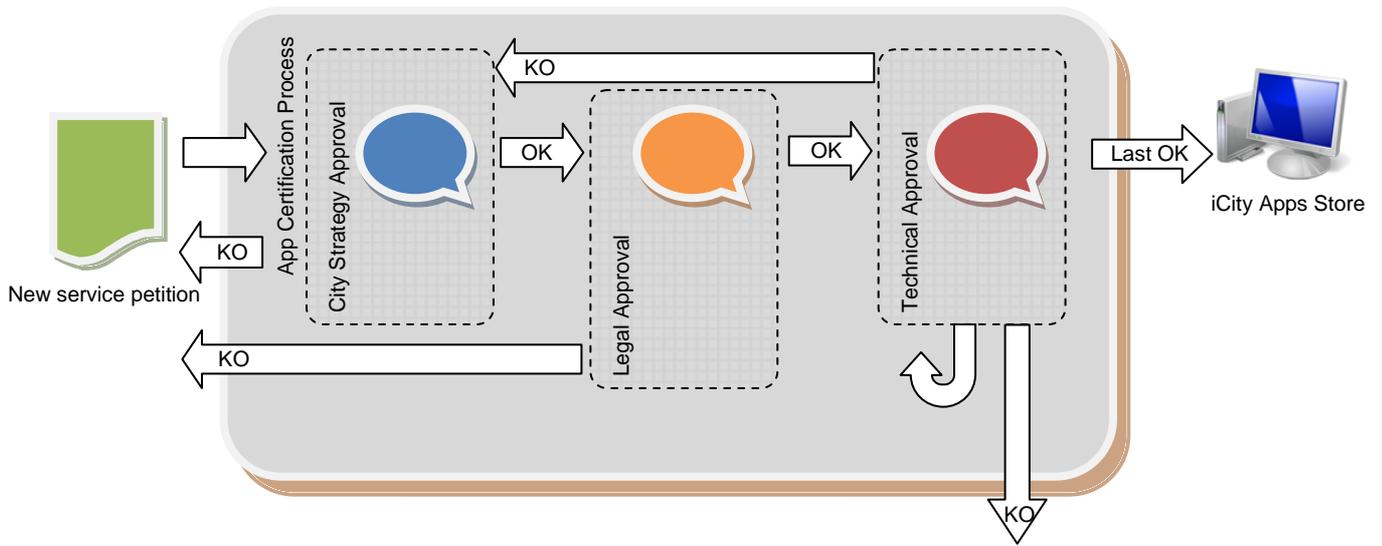


Fig. 15App certification process schema

## 7. Future developments

In the section 4.1 "Technical vision of iCity Apps Store" there is a deep explanation about the two main elements of iCity Apps Store:

- iCity Apps Showcase.
- iCity Apps Hosting.

The first one is essentially a website – one for each city – with a list of all the applications using open infrastructure's services via iCity Platform.

A future development could be to create mobile apps specific for major mobile devices. This will approach the iCity Apps Showcase to those environments already known by the mobile devices' users, such as Apple iPhone Apps Store or Google Play Apps Store.

If we implement this improvement, another future development could be to join the meta data of iCity Platform with metadata of external apps stores, like Apple iPhone Apps Store or Google Play Apps Store. This action will provide information consistency of each app to its users, (app downloads, users' comments, user's ranks, etc).

Another improvement could be an end-user register in order to store up preferences or to offer RSS services. With this information, the iCity Apps Store could provide additional services such as an intelligent search engine that proactively notifies the user about new apps that are potentially of interest, or a service that notifies each developer statistical information about the apps users.

Presumptively may exist apps focused on a narrow group of users that will need a hard validation. A deeper analysis is to be developed to determine if those apps might be downloadable from the Apps Showcase or only listed as existing applications.

## 8. Risks

The following table gives an overview of possible risks identified beforehand, indicating the remedial and mitigation strategy to prevent them or to reduce their impact in the iCity Apps Store:

Description of possible risk	Impact	Probability of occurrence	Remedial Actions
<b>Lack of deep knowledge of Apps certification process</b>	High	High	A deeper analysis must be carried out in order to define how to certificate an app.
<b>How to identify an app</b>	High	High	A deeper analysis must be carried out in order to define how to identify a certificate app.
<b>Lack of fit the iCity Apps Showcase with potential Apps Stores already created in some cities</b>	High	Medium	Write a specific technical documentation about the functions that iCity Apps Hosting provides to iCity Apps Showcases.
<b>Legal requirements on infrastructures use&amp;data access and control</b>	Medium	Medium	Ongoing discussion open and input into WP2.
<b>iCity Apps Store must be technical complaint with iCity Platform</b>	Medium	Medium	Working together WP5 with WP3 and WP4.
<b>Having available showcases in each city</b>	High	Low	The four cities already have (or intend to) a showcase.
<b>Match in time the building of the iCity platform and the building of iCity Apps Store.</b>	Medium	Low	Working together WP5 with WP3 and WP4.
<b>How to engage developers considering that we do not use the Official App Stores.</b>	Medium	High	Explain many times as necessary the strengths of the project
<b>How to obtain apps use indicators (especially if the app is already available in official apps stores).</b>	Low	Medium	Finding out how to obtain indicators of use of apps available in other stores.
<b>How to make clear that iCity Apps Store is beyond the mobile applications?</b>	Low	Medium	Explain many times as necessary what is an app in iCity context.
<b>Legal framework changes</b>	High	Low	Be aware of possible legal changes.