

# 3cixty: A Platform for Apps That Offer Comprehensive Views to City Visitors

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**Abstract**—The 3CIXTY platform supports the development of (mobile or web-based) applications that exploit a comprehensive urban knowledge base in innovative ways, offering a “360-degree view” of a city. We demonstrate an application, called EXPLORMI 360, that makes use of the services offered by this platform and allows users to plan and conduct city visits in an innovative way.

## I. MOTIVATION

Visitors to a city have plenty of mobile and web-based applications at their disposal to help them navigate the new environment: apps for finding hotels, restaurants, tourist sights and events as well as apps concerning transportation modalities. Even in an app that gives access to several such data sources, there are typically limited possibilities for exploring multiple data sources at the same time to satisfy complex information needs. Consider a person who wants to find a hotel that is within 10 minutes by public transportation of a worthwhile concert as well as within walking distance of a gym: She will probably have to use several apps to access the relevant information, and she will have to combine the different types of information in some ad hoc way such as making notes on paper.

## II. PLATFORM

The 3CIXTY platform aims to support the development of apps that make it easier for city visitors to deal with multiple types of data at the same time. As can be seen in Figure 1, it is built around a semantically integrated (cf. [1]) knowledge base that contains information about various types of events, points of interest, means of transportation, past actions of the user, and evaluations given by other people. Powerful queries to the knowledge base, which enable the straightforward fulfillment of information needs like the one described above, can be made by apps in the language SPARQL (including GEOSPARQL for spatial relationships).

## III. SHOWCASE APPLICATION: EXPLORMI 360

The potential of the 3CIXTY platform is showcased by the application EXPLORMI 360, which comprises the web-based and the mobile parts illustrated in Figures 2 and 3, respectively.

The web-based part (<https://www.3cixty.com>) extends the *parallel faceted browsing* technology contributed by 3CIXTY partner DFKI; see [2]. As with conventional faceted browsing,

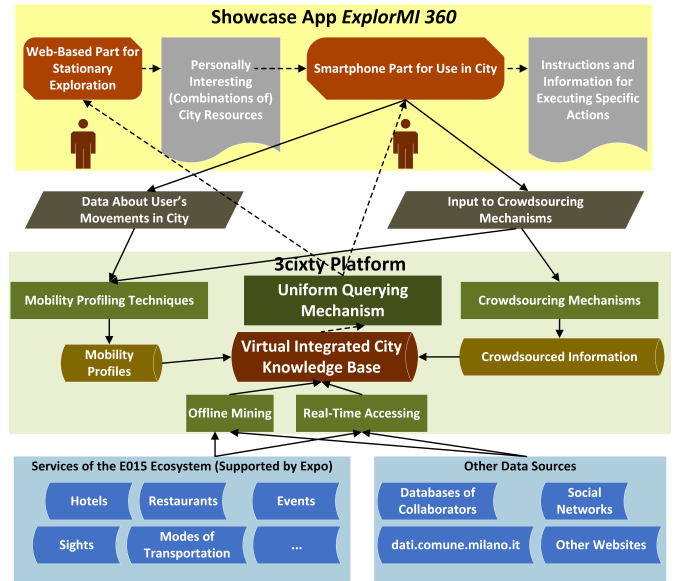


Fig. 1. Relationships among components of the 3CIXTY platform and the showcase app EXPLORMI 360.

the user can construct queries by applying combinations of filters; the difference is that the results of multiple interrelated queries are displayed simultaneously, which facilitates exploration, comparison, and search for interrelated items. The user can also search for items that have a particular relationship to an item (or set of items) already found (e.g., being reachable within a certain period of time by metro). The user can save any interesting item in a *wish list*, which is accessible to any 3CIXTY application, including mobile apps that enable users to exploit the results of their exploration while they are moving around the city.

An example of such a mobile app is the mobile part of EXPLORMI 360 (Figure 3), developed by 3CIXTY partner Telecom Italia, which will have been published in the Android and iOS app stores by the beginning of Expo 2015 (May–October). It reminds visitors of events and points of interest on their wish list, gives them directions and other relevant information about these items, and allows them to access the 3CIXTY knowledge base to perform some real-time

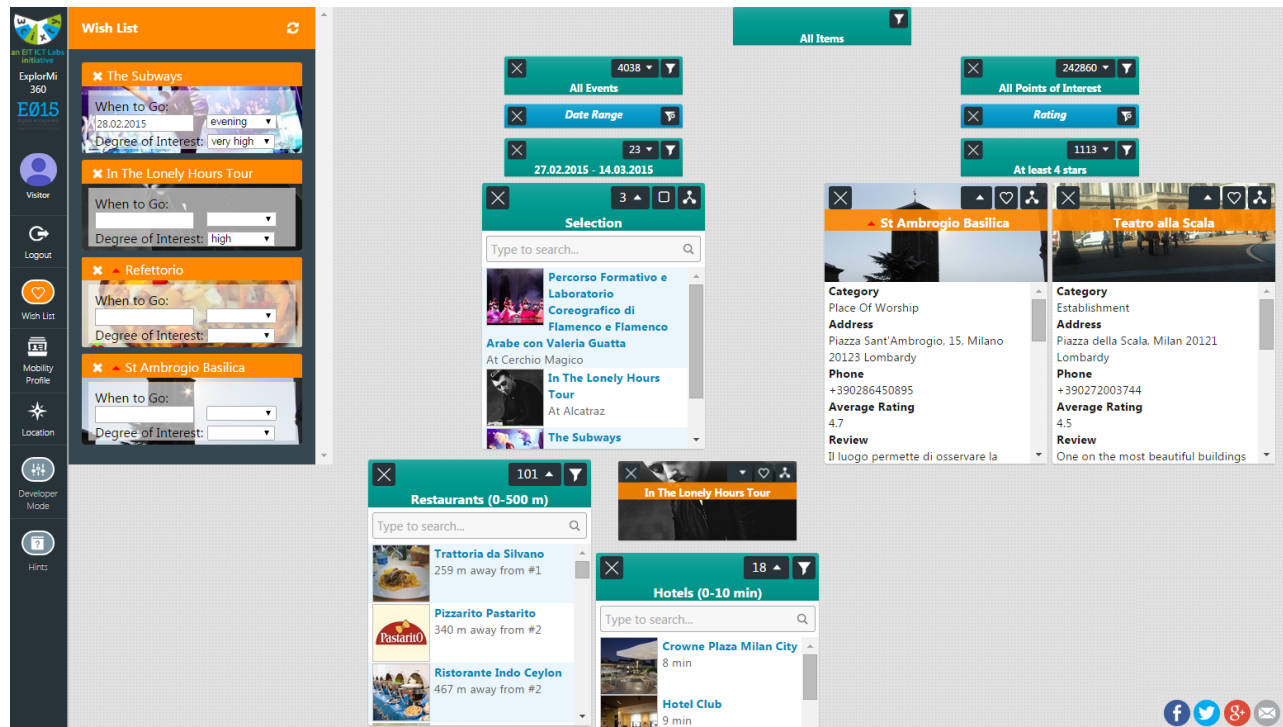


Fig. 2. Snapshot of the use of the web-based part of EXPLORMI 360, illustrating the paradigm of *parallel exploration*.



Fig. 3. Screen of the mobile part of EXPLORMI 360 that offers several functions related to an item on the user's wish list.

exploration of items related to those on the wish list.

#### IV. MOBILE SOFTWARE ENGINEERING CHALLENGES

EXPLORMI 360 is intended to be just the first of a growing number of applications that make use of the 3CIXTY platform as it is extended to cities and regions outside of Milan (e.g., London during 2015). To facilitate the growth of an ecosystem of "3CIXTY apps", the 3CIXTY team is addressing

the following software engineering questions, which will be discussed at MOBILESOFT 2015:

- 1) How can a tool for the rapid development of mobile (and/or web-based) applications make it easy for developers to create apps that effectively exploit the 3CIXTY platform?
- 2) How can 3CIXTY apps with different functionality be linked effectively, so that, for example, a visitor can invoke several different apps that provide complementary information or services regarding a given point of interest (e.g., the Duomo of Milan)?

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