EVA 2013 Florence
Conference

MarcoPolo
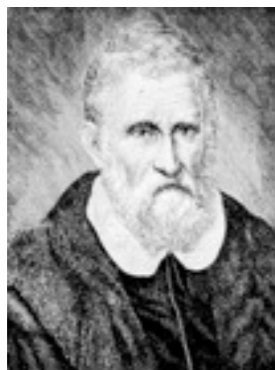
Agile Development of Mobile Cross-Platform tourism Applications on the Cloud

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The Project MarcoPolo

- **Agile Development of Mobile Cross-Platform tourism Applications on the Cloud**

- **Started in December 2011, 24 months, 1 M€ project, with 2 italian partners :**
    - *Asset Data S.r.l., Roma (Coordinator)*
    - *Rigel Engineering S.r.l., Livorno*
    - *Paradigma Tecnologico S.A., Madrid (Spain)*

- **Co-financed by the MIUR (Italian Research Minister) and the European Community**
    - under the EUROSTARS innovation program
    - addressed to European research intensive SMEs.

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Driving forces

- **Societal level: radical transformation in cultural tourism fruition due to**
  - Democratization of travel and cultural consumption (though superficial),
  - Low-cost flights,
  - Unstructured and personal tourism experience often with strong individual focus,
  - Strong reference to personal assistance and guidance instruments, both in terms of location (GPS navigation) and cognitive orientation (individual tour guides)
  - Growing interest exists for less obvious and minor touristic target (i.e. the **long tail** of the tourism and culture app markets)

- **Technological level: wide availability of personal devices**
  - smartphones, PDAs, navigators, tablets, Heads Up Displays (e.g. *Google Glass)*
  - cheaper and easier to use (touch technology, high resolution displays and more intuitive Operating Systems)

- **Economical level: app market and business opportunities**
  - mobile applications market is booming (Apple App Store scored 50 billions DL),
  - cost reduction of reliable software development is very important: companies are not able to make huge investments in competitive developments,
  - high competition in apps market,
  - need for a **quick** and **cost-effective** development process to build and adapt mobile apps to be conveyed to the users (tourists).

MarcoPolo objectives

- **Devise an innovative approach to**
  - enable professional services for cultural tourism application,
  - speed up mobile tourist app development for smartphones and tablets (Android and iOS), by:
    - analysing behavioral patterns and information use in "experience tourism"
    - building mobile cross-platform applications based on agile techniques and the notion of metaframework

- **A metaframework is defined as an integration of different development framework, providing an abstraction layer from the details of each framework**

- **Target users and application scenario**
  - end-users in any range of ages that download and use mobile applications to play, search and share knowledge while accessing or visiting cultural venues
  - data intensive apps (such as tourism guides, visiting support, interactive and social apps)

MarcoPolo methodology (1/3)

- **Apps are currently developed according to two main approaches**
  - **native app**, using the development frameworks provided by mobile OS, mainly iPhone (Apple) or Android (Google),
    - efficient time to market for including new updates of the operating systems, but
    - development and maintenance for each platform, using different technologies (Java, C, Objective C),

  - **web app**, using mobile frameworks such as PhoneGap or Titanium, based on JavaScript
    - the core application can be shared between different devices, specific functionalities included as a branch, but
    - immature technology (no leading or standard), many frameworks and their evolutions pose productivity issues (learning curve for engineers, migration issues).
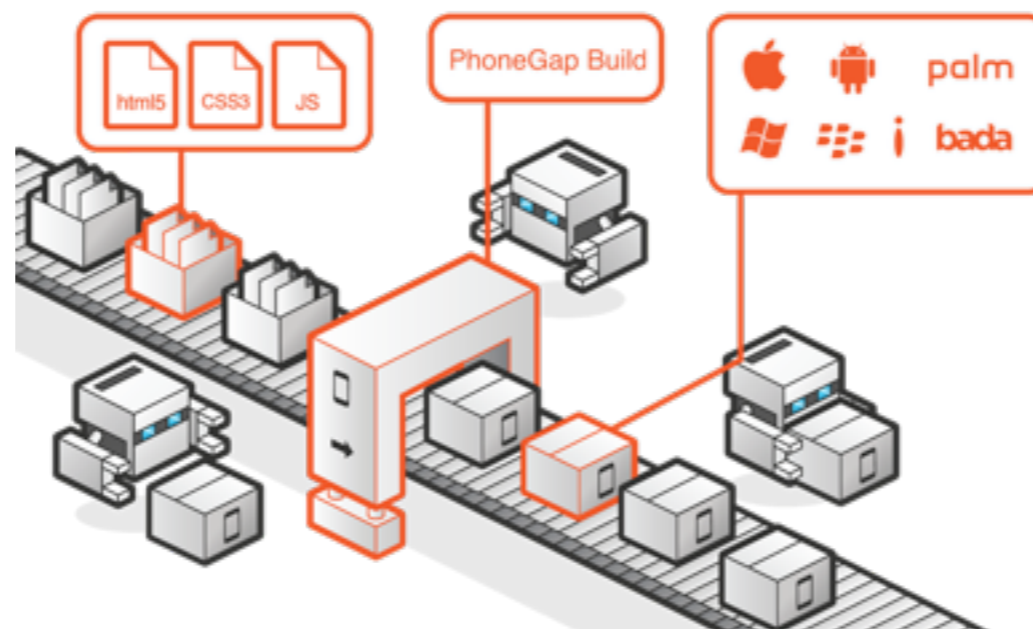
MarcoPolo methodology (2/3)

- **Need for a paradigm shift**

  - **From** old manual techniques and "handcraft" manufacturing solutions:
    - low flexibility in reuse and adaptation of the apps (each application has to be developed for each target device)
    - limited productivity, since the developer needs to rebuild the mobile app in case of changes in the application logic (e.g.thematic finalization of the guide)
    - high intellectual labor intensity to keep pace of mobile frameworks' rapid and continuous evolution,

  - **To** industrial oriented methodologies
    - suitable for large scale production (focus on the application domain and then generate automatically the packaged application depending on the targeted device),
    - aimed at different fruition target,
    - flexible in reuse.

MarcoPolo methodology (3/3)

- **Our approach is to use a metaframework implementing MDA techniques to generate native web applications**
  - based on existing multi-platform web frameworks (Cordova/PhoneGap, Backbone, Bootstrap).
  - reducing the technological risk of selecting one of these frameworks with unknown evolution,
  - preserving the big advantage of developing cross-platform applications for reaching more potential customers
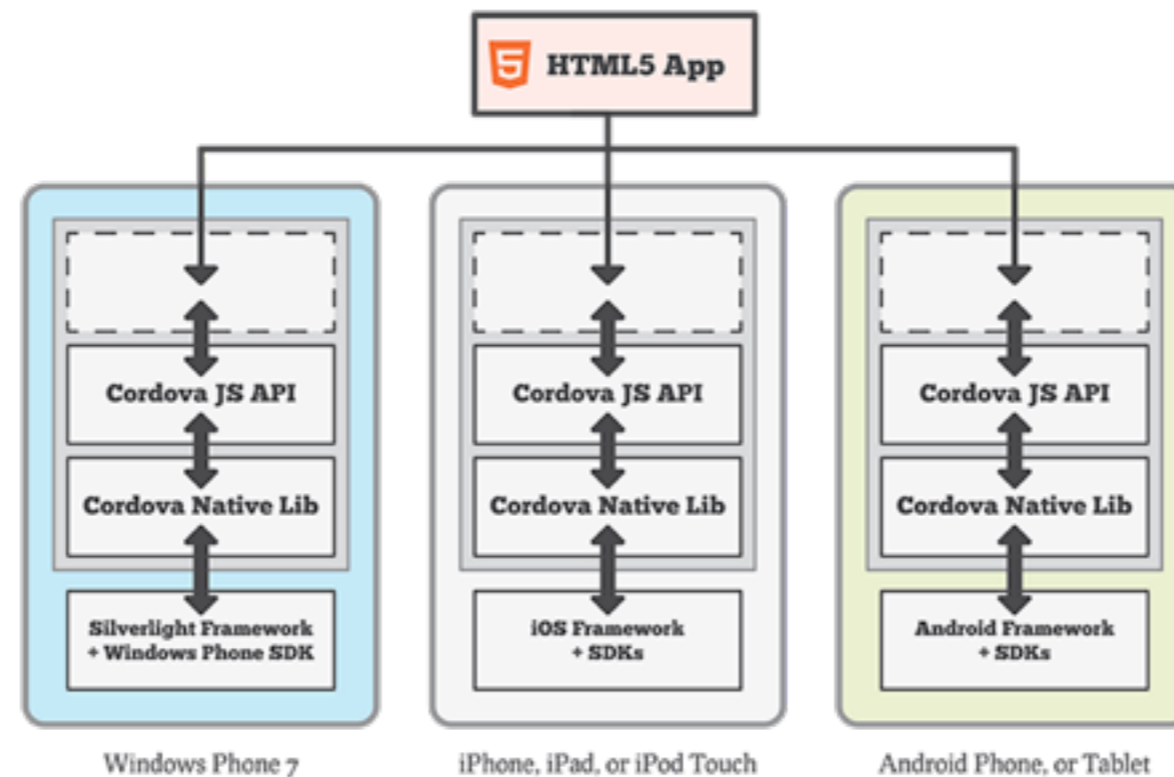
MarcoPolo results (1/2)

- **Mobile Metaframework**
  - provides a common interface to the different mobile cross-platform development frameworks
    - i.e. the set of programming libraries used by developers, like jQuery Mobile, Appcelerator Titanium, PhoneGap/Cordova)
  - allows developers to focus on business logic and abstract from implementation details of the specific framework
    - they can integrate the latest breaking technology in their application without modifying the domain and application logic because they are really <u>decoupled</u>
  - is based on the Open Source Roma Metaframework and Model Driven Architecture (MDA) techniques
  - open source business-friendly license (Apache2) for B2B apps.

MarcoPolo results (2/2)

- **Cloud-based Integrated Development Environmant (IDE)**
  - a collaborative, web-based IDE which provides a simple web interface for deploying data intensive mobile applications to end users
  - the IDE's drag & drop paradigm enables end-users without any programming skills their own applications for their devices by connecting existing components from a pre-configured library.

- **Device Model**
  - a 'meta-device' or device model for collection the different facilities (sensors and actuators) provided by smartphones and tablets.
  - potential contribution to needed standardization efforts.

- **All the results will be released as an Open Source project**
  - strong contribution to validation and evolution of the products,
  - open source business-friendly license (Apache2) for B2B apps.

User experience in tourism apps (1/2)

- **The application scenario selected for the project is the use of mobile apps for the fruition of touristic and cultural experiences**

- **Preliminary work was based on examination and study of the literature on visitor studies, to identify any behavioral patterns of use in cultural places**

- **We analysed phase focused on user experience and behavioral patterns for tourism fruition, trying to devise use cases**
  - modelling interactions between users and explanatory/additional content
  - modelling interactions between users and portable information devices used to access the content

- **We examined users behavior during fruition of tourist and cultural places**,
  - in order to model the behavior of different categories of users in the cultural spaces, both indoor (museums and other cultural containers) and open-air (cities, art and cultural districts).

- **Next, we analysed the digital content to be delivered through mobile devices**
  - and the relationships established between such cultural content and mobile device users during the cultural experience

Conclusions and future work

- **MarcoPolo is addressing an innovative tourist app dev process**
  - Taking advantage of industrial practices, research progress and emerging web 2.0 technologies
  - Involving real users (professional developers in the open source community) in the development of the methodology and tools (essential for market acceptance).

- **The first part of the research was dedicated to**
  - Accurately modeling user needs and behavior during fruition of cultural tourism events,
  - Devising an innovative methodology for the efficent development of tourism mobile apps,
  - Defining a loosely-coupled system architecture
  - Starting the development of the mobile metaframework.

- **Next steps in the project are …**
  - Finalizing the development of the metaframework and defining the Deveice Models
  - Designing and implementing the Cloud IDE for app development,
  - Evaluating the Cloud IDE with real app developers.

MarcoPolo ...

Thank you for your attention !

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