MULTICHANNEL HUB

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Introduction and objectives

The modern society is developing around a global information infrastructure, even more complex as the process of information exchange has grown. It is supported by new capabilities, and potentialities, offered by the spread of information technologies, and especially web-based internet applications.

An Information Ecosystem thus is a network of interactions arising between information providers and users. In a e-government context, the information exchange is focused on interactions between citizens and Public bodies in an environment of continuous changes, caused by commercial, political, social and technological developments. This new environment is characterized by the proliferation of communication channels and devices and by a process of diversification of user needs.

According to this approach, the aim of this project, developed by CSP – ICT Innovation and the City of Turin (Italy), is to work out a multichannel application as a concrete solution that can meet social, psychological and technical needs. In fact, thanks to its hardware and software architecture, it is possible to modulate the information supply, on the basis of different users and devices.

This system, called *Multichannel Hub*, is directed towards collection and delivery of heterogeneous information. It is able to optimize the content publishing process, from Governments and Public Administration bodies to citizens, on different media (such as desktop, multimedia applications, PDA, traditional and new generation mobile phones, digital terrestrial television, voice applications

and so on). In particular the *Multichannel Hub* is part of a wide-ranging project developed in the last years for the City of Turin[1], the first Italian City in terms of technological innovation services[2].

Methodology

The methodology followed for the development of the *Multichannel Hub* started with the drawing up of a user requirement analysis. Afterwards, a feasibility study was conducted with the technological aim to integrate and transform information coming from different providers, throughout standard web languages and technologies. The use of XML format, in fact, allows the integration of different sources and data formats, supporting the information exchange from one application to another.

The *Multichannel Hub* has been correlated with the development of a prototype integrating several projects carried out by CSP – ICT Innovation for the City of Turin during the last years: the City Interactive Map, the Official Tourist Web Site as well as UbiquiTO, a Multi-Device Adaptive Tourist Guide.

Summary

The multichannel access to information represents one of the most innovative themes in the transition process from e-government to m-government. The main objective of this process is to increase efficiency and productivity of information delivery, focusing on a model for the improvement of relations between citizens and Governements.

In these terms, the *Multichannel Hub* project aims to define an hardware and software architecture, able to promote what we called Information Ecosystem: a virtual space potentially accessible by everyone, from everywhere and with any device.

In 2003 CSP – ICT Innovation and City of Turin developed the first prototype of "Città di Torino Mobile Edition", characterized by some selected information optimized for PDA, useful mobile services, brief and clear texts and an easy and direct information browsing.

At the beginning of 2004, on the basis of usability tests and further analysis, a first redesign of the prototype was made[3]. That release provided a refinement of the usage model and scenarios, more information providers, an improvement of the information architecture and PalmOS portability.

The last step of this project led to a prototype of a multichannel editing and publishing system able to guarantee the content supply from different providers: the *Multichannel Hub*.

This prototype is a normalization tool for complex systems, characterized by:

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[1] Città di Torino, Servizio Telematico Pubblico, www.comune.torino.it, editor and referent: Franco Carcillo.
[2] http://www.censis.it/277/372/4977/5108/5178/5181/content.asp
[3] www.topda.it

- Heterogeneous content providers and management rules;
- Heterogeneous types of content;
- Heterogeneous media;
- Heterogeneous users.

The purposes of the *Multichannel Hub* can be classified in three categories, dealing with ergonomics, contents and technology. In fact, this system adapts the user interface according to the device as well as it maintains the interface usability, apart from the device itself.

As regards contents, the *Hub* can modify the information provisioning on the basis of the characteristics of the device and normalize the information sources. This last aspect allows editorial staff to edit and distribute different kind of contents without any constraints. The system is able to receive and deliver any data format[4], adapting itself to the usual content management of any editorial staff. In fact, it does not compel content providers to mark up their distributed information in a specific way.

As regards technological aspects, the *Hub* integrates and transforms information using standard web languages and semantic mark-up.

The *Hub* is based on these five main design principles:

1. <u>Independence from external information sources</u>: the system is realized without any restrictions derived from actual available sources;
2. <u>Independence from sources file formats</u>: the *Hub* is able to accept any new file format; it allows an easy development of new modules, able to integrate unpredicted file types (such as new XML syndication standards);
3. <u>Independence from users devices</u>: external sources can be integrated and translated in a unique mark-up language, that includes also some meta-information about the source and the information context;
4. <u>Web Standards support</u>: HTML 4.01, XHTML 1.0 transitional, CHTML, CSS 2, CSS Mobile profile ed RDF ensure the best compatibility, extendibility, accessibility of web contents;

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[4] For the time being, the data format accepted by the system are:
- Text format: rss, atom, xml, xhtml;
- Image format: jpg, gif, png;
- Video format: windows media file;
- Vector graphics format: shockwave flash;
- Other format: pdf.

5. <u>Openness</u>: it is easy to create a new source compliant with the application. The *Hub* provides programming interfaces for everyone wants to contribute.

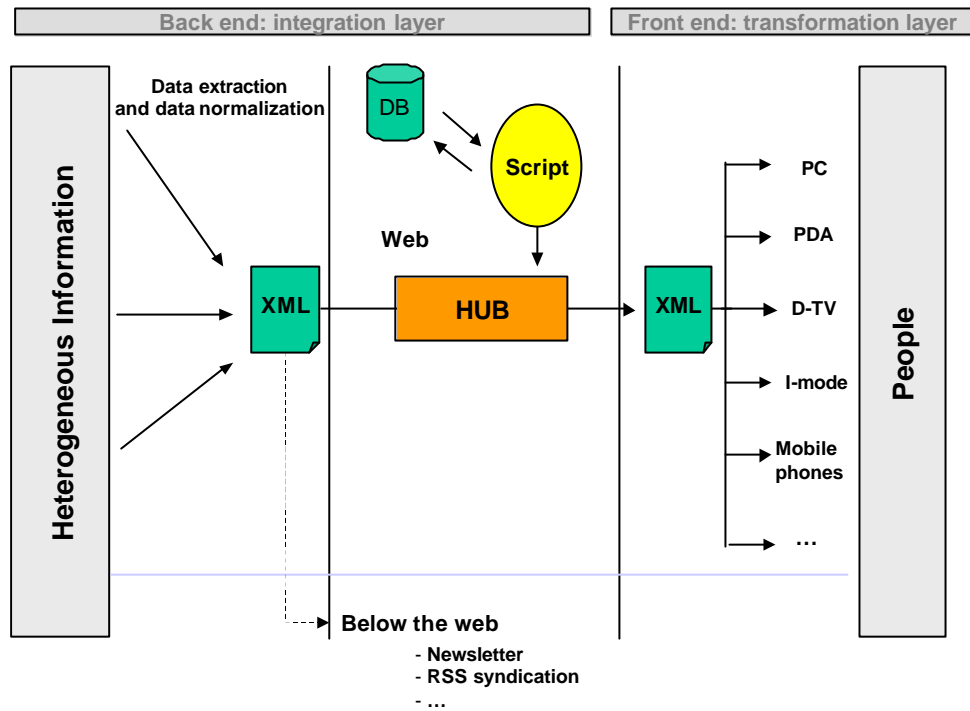Figure 1 shows how the application works.

FIG. 1 Multichannel Hub's Architecture;

The diagram represents the *Hub* structure:

1. an **Integration Layer**, dedicated to external sources treatment, e.g. aggregation, organization and normalization. Data are structured with an XML vocabulary that provides uniformity between different media (images, text, video, vector graphics and so on). This layer is also able to offer different kind of functionalities related to content management, such as original content editing or meta-data manipulation;

2. a **Transformation Layer**, designed for the management of several elements like:
   a. content's structure;
   b. content's organization (information architecture);
   c. presentation styles.

Conclusions

The developed prototype reached some important results as concerns technological and applied innovation, especially in the Italian government context.

In short, the results can be summarized as trial and evaluation of:

- flexibility and interoperability of semantic web;

- opportunities offered by web resources and web services;

- multichannel publishing processes;

- integration strategies among different information providers, in terms of content, technology and editorial rules;

- interaction and interface design for non-conventional devices (PDA, smartphones and DTT,…);

- multichannel access to public services for disadvantaged users (senior and disabled users);

- a survey methodology focused on the knowledge of user information needs in unusual contexts of fruition (mobile device, DTT,…).