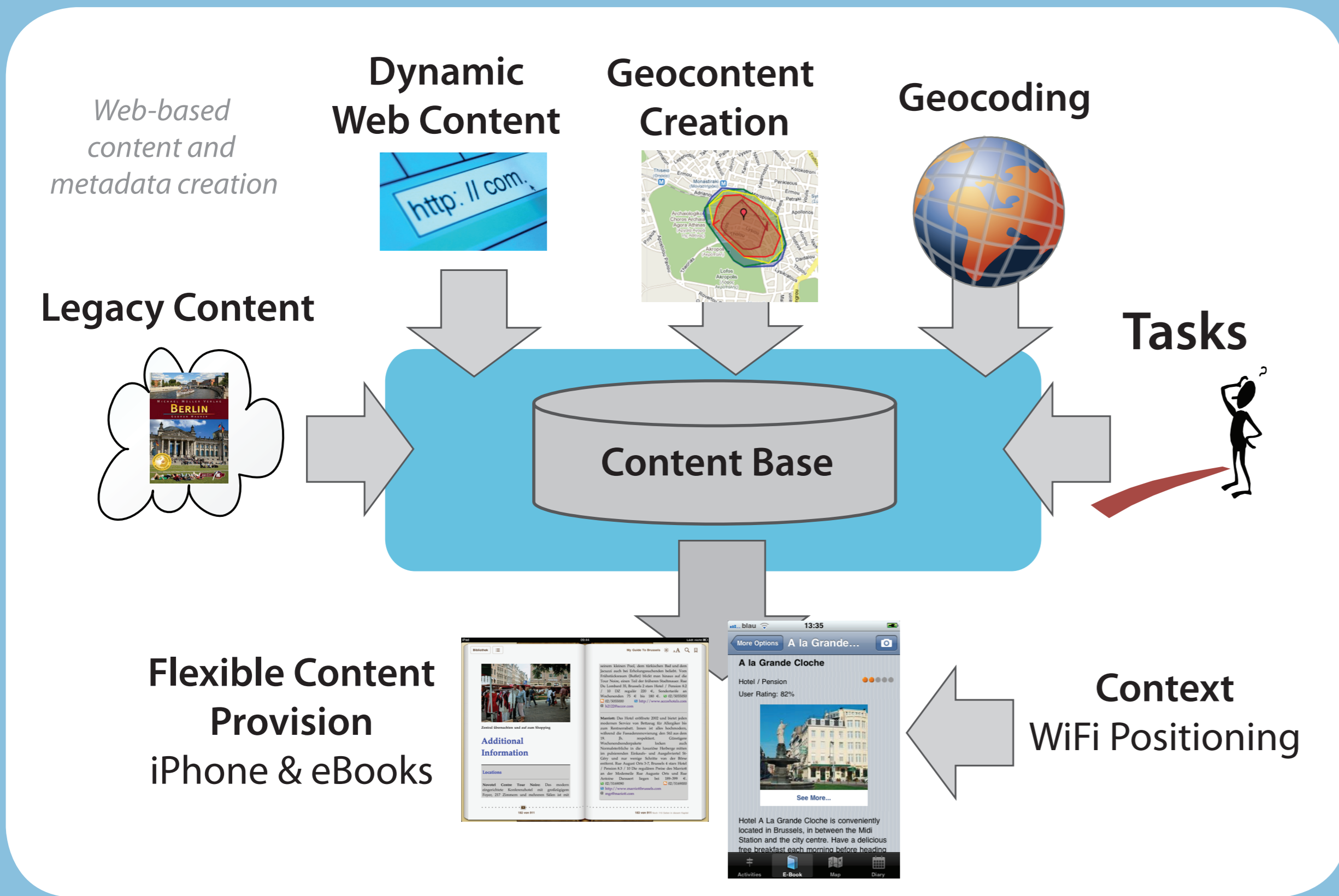




Task aware location-based services for mobile environments



www.talos.cti.gr

The Project

The TALOS project - "Task aware location based services for mobile environments" - aims at bridging the gap between traditional LBS and general Web content in that task computing will provide purposeful, rich, geo-enabled Web content to mobile devices.

The goal of TALOS is to design, to develop and to evaluate a complete framework that will enable the task-aware provision of content to mobile users.

The market of mobile services is still dominated by simple infotainment services. This is especially apparent in the area of Location Based Systems, which with few exceptions (e.g. navigation), have not fulfilled its predicted commercial success in mobile environments. Reasons are that (i) content offered in typical LBS applications is still narrow and static, (ii) available methods and interfaces in mobile handsets for the discovery of available content are at best insufficient (e.g. keyword type search), (iii) mobile users still require a GPS module (integrated or autonomous) to utilize location based services and (iv) existing structured content available in several LBS applications is hard to reuse.

The developed software framework will contain all the necessary programming tools, libraries, APIs, and authoring tools, to provide modularity and simple integration of the proposed task computing concept with existing solutions.

The Task Annotation Tool relates the content to actual tasks. The tool is implemented as part of the Web application toolkit for manipulating content and metadata.



Content Manipulation

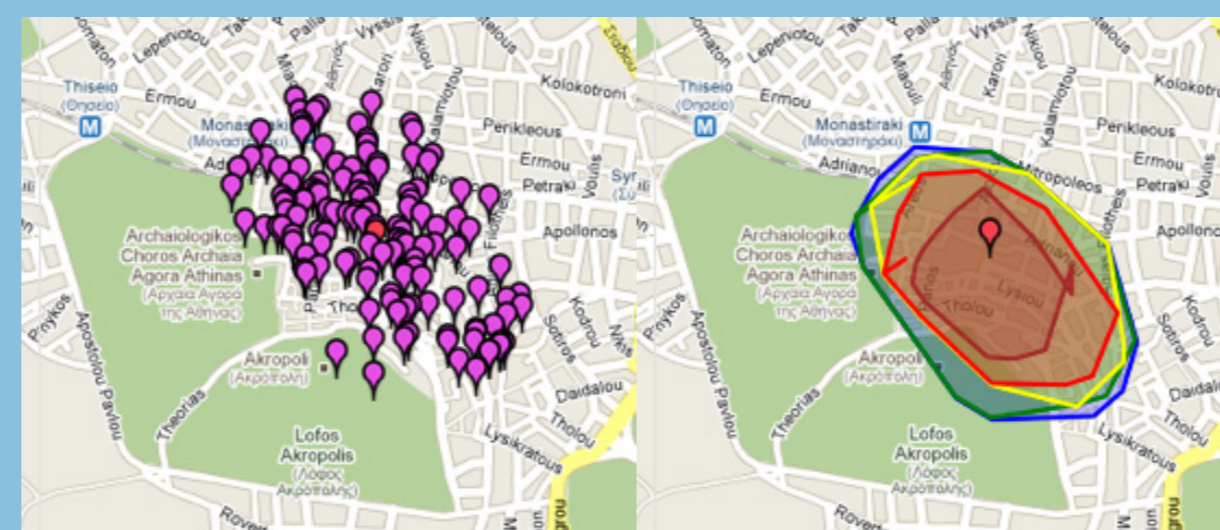
A content repository provides for efficient manipulation of content to address whatever device and form necessary.

The repository can be accessed using a Web-based content manipulation interface providing the following functionality:

- full-fledged text manipulation of the content stored in the re-pository, i.e., editing, adding and deleting of content while at the same time providing for rich-text formatting features
- a task annotation tool
- a geocoding toolkit - semi-automatic annotation of content with geospatial metadata
- a Web scraping framework - annotation of (static) content (as in book content) with dynamic Web content from the Web

Metadata

Geospatial content creation tools take massive amounts of user-contributed low-accuracy geospatial data and fuse this data to generate geospatial data of higher quality as output.



Area of Plaka in Athens as defined by geocoded flickr images.

Prototypes

Two prototypes have been implemented to showcase the content management and consumption approach in TALOS. An eBook-based task-aware travel guide includes a portal Web site that allows travelers to buy or select a travel guide of their choice. It allows the traveler to save additional content from the Web to his or her personal space, tag the additional content with relevant tasks and add the tagged content to the travel guide. The travel guide including additional content can then be downloaded in an eBook format.

The TALOS Approach

Project Objective

- The TALOS project objective is the development and creation of
- a task-based content provision technology for mobile computing
- effective Web-based content management tools including metadata creation and manipulation
- mobile client prototypes for iPhone and eBook.

Project Results

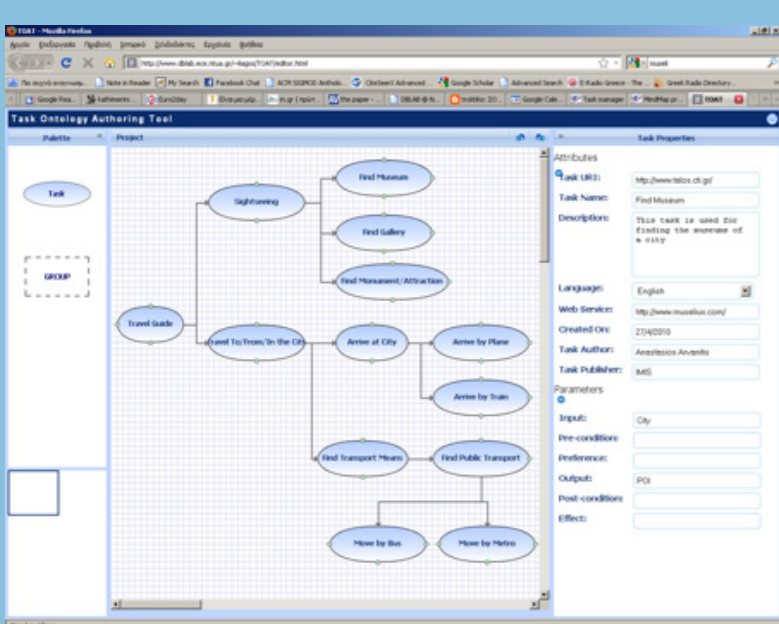
Context Aggregation

This module captures the user's contextual attributes by (i) introducing an iPhone compatible "soft-GPS" Wireless Positioning component, (ii) a wardriving server to capture WiFi access point locations, and (iii) a GUI application for assisting users to create radio maps for indoors and outdoors scenarios.

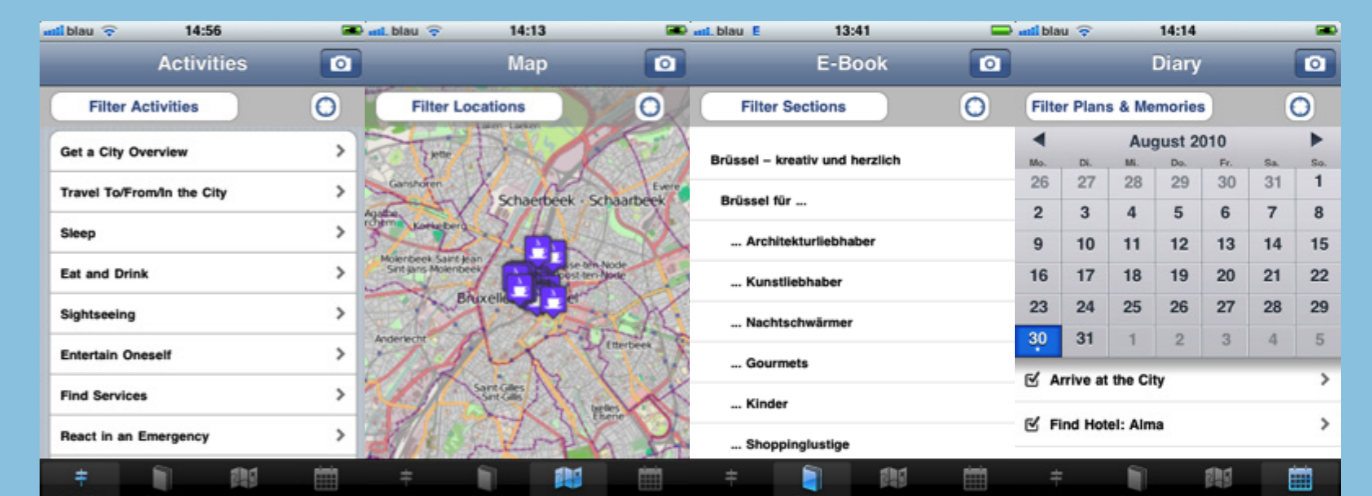
Task Computing

The Task Computing Framework comprises (i) a Task Ontology Authoring Tool (TOAT) and (ii) a Task Annotation Tool linking content to tasks.

The Task Ontology Authoring Tool relies on a formal model that is used for describing the various tasks of the end-users in the context of TALOS. The interface and the functionalities of TOAT are based on the results of actual user surveys involving both expert and non-expert users, and the requirements defined by the SMEs.



The iPhone app offers data extracted from the content repository in various representations through task-based interfaces. The fact that available content is organized around tasks in combination with the exploitation of the user's context leads to efficient and personalized content provision.



The mobile travel guide includes four modes of operation: (i) the activities mode (tasks), (ii) the eBook mode, (iii) the map mode, and (iv) the diary mode.

Key Concepts

Context Aggregation

fills the gap between what users really want to do and the capabilities of devices and/or services that might be available in their environments. It presents substantial advantages for non-expert computer users. It is a time- and effort-saver for all types of users and is particularly suited for pervasive or ubiquitous computing environments.

Geocoding

is the process of finding associated geographic coordinates (often expressed as latitude and longitude) from other geographic data, such as street addresses, or zip codes (postal codes). The coordinates can be embedded into media such as digital photographs via geotagging.

User-generated Content

refers to various kinds of media content, publicly available, that are produced by end-users. In the present context, we specifically focus on geospatial content, i.e., the positions of spatial objects as contributed by non-expert users.

Soft Positioning

refers to the exploitation of current and emerging ubiquitous wireless networks in order to estimate a user's position. A user's position can be extracted from GSM, WiFi, Bluetooth and proprietary RF networks..



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