A New Architectural Paradigm for Content-based Web Applications: Borè

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IDEAS 2011 – September 21-23, 2011, Lisbon
Outline

- Introduction
- Framework
- Taxonomies
- Social Cooperation and CF
- Exploiting Borè
- Related Work
- Conclusions and future works
Introduction - Context

- Web 1.0 – Container of static information provided by organizations. Taxonomy.
- Web 2.0 – Dynamic Interactions among users (communities, social networking). Folksonomy.
Introduction - Objectives

- Defining, organizing, storing, querying and displaying information as customizable objects and relations
- Building Social Networks through user resource sharing
- Analysis of user activities and knowledge discovery
Introduction – Current Solutions

- Borè significantly differs from well-known state-of-the-art competitors
  - Frameworks – fully customizable and extensible (not easily)
  - Applications – meant to simply publish user’s contents on the Web through a variety of templates, components and tools
- Borè features include the characteristics of both categories
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Framework – Preliminaries

- Exploit principles of the object-oriented programming
- The logic model of a Web application is a directed graph ‘G’
  - Nodes are the resources
  - Edges are relations among pairs of resources
- Web information is represented by structuring raw data in high-level content objects
Framework – Preliminaries

- Each resource/relation is a pair \{type, instance\}
  - Type is the definition (schema)
  - Instance is the type instantiation
- Single inheritance property
- Developers Advantages:
  - Module Reuse
  - Simplified Code Development
  - Ease of Extension and Maintenance
Framework (1/2)
Framework – View

- Navigation and query-result visualization
  - Final rendering to user browser
  - Query Answers delegated to the **Interface Composer**

- Automatically-generated Interface

- Extensible Modules (Template, Style Sheet, Custom View)
Framework – Controller

○ **Query Manager**: interprets user requests and translates them into the corresponding browsing or update operations on the graph

○ **Access Control**: coordinates nearly all modules of the platform and controls the access of users (or groups of users) to resources

○ **Event Manager**: handles events through pluggable, customizable and extensible Action Manager
Framework (2/2)
Framework – Model

Primitive functions for query answering and for updating the graph (schema and instances)

- **Resource/Relation Manager**: responsible for accessing, storing and updating the individual resources/relations) and the resource/relation taxonomies

- **Storage Engine**: handles raw data. Raw data is retrieved through the Data Index, which contains meta data type information, and the Cartridge Manager, which loads, stores and updates the various instances

- **Profile Manager**: creates resource profiles by analyzing the requests for the individual resources
Framework – Extension Points

- **View**
  - Custom View, Templates, Style-Sheet
  - Field Tagging in Pre-Compiled Form

- **Controller**
  - Custom Event(s) associated to resources
  - Timers, email notifiers...

- **Model**
  - Pluggable Data-Cartridge
  - Relational DB, File System, XML DB...
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Taxonomies – Resource Types

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Taxonomies – Example (1)
Taxonomies – Example (2)
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filterUp (Un. of Calabria, {Person}, {Collaborates}, age < 30) = {J. S., B. J.}
filterUp (Un. of Calabria, {Person}, {Works}, age < 30) = {J. S.}
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Social Cooperation

- The user is the center of the web
- Even the user is a Web Resource
- The user is free to create her own *Web Universe* and share it with other users
- An environment of social cooperation and social networking spontaneously arises

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Collaborative Filtering

- Identification of relevant relations among resources (and communities!)
- Build a correspondence matrix for each relation
- Application of suitable collaborative filtering techniques
- Discovery of new relations and activities among the resources
- Recommendation to the end user to enrich her browsing experience
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  - Borè for Research Institutes
  - SunBorè
  - Condomani
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Exploiting Borè - Browsing

**Name:** University of Calabria

**Activity Description:** The University of Calabria is a public institution with legal personality aimed at scientific research, cultural education and the civil progress of the society in which it operates.

**Name:** Alice

**Surname:** Moore

**Age:** 40
Exploiting Borè – Resource Type Creation
Exploiting Borè – Instance Creation

The agenda is still work in progress and subject to change. Please note: discussions will be mainly delivered in English.
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Borè for Research Institutes

www.icar.cnr.it
Borè for Research Institutes
Borè for Research Institutes

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A New Architectural Paradigm for Content-based Web Applications: Borè

Source
International Database Engineering & Applications Symposium
21-23 September, Lisbon Portugal
Issue Nr. (2011)

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Ettore Ritacco

Editor
Bernardino, Cruz, Desai

Category
Short Paper

ABSTRACT
The Web is an evolving system, which tries to adapt to the needs of users. The transition to Web2.0, and currently, to Web3.0, are the expression of this trend: the goal is to focus on the leading role of the end user in Web browsing, which should be supported by adequate tools. In this paper, we propose Borè, an architectural paradigm for developing content-based web applications based on cooperative interaction, whose foundations are based on the principles of the model Web3.0.

The proposed architecture is extremely innovative in three respects. The first one is the possibility of defining, organizing, storing, querying and displaying the information as customizable objects and relations: a not-expert user can create the Web that he/she may prefer. A second aspect is the realization of social networks (Social Cooperations), which spontaneously arise, through user resource sharing. Finally, there is the possibility of analyzing users' browsing activities, through learning tools that enable the user to enrich his/her Web browsing experience with new knowledge.
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  - SunBorè
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**SunBorè**

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**Inclinazione Moduli Fotovoltaici (Gradi 0):**

- 30°

**www.bisotech.com**
**CONTRATTO DI FORNITURA IMPIANTO FOTOVOLTAICO**

**Agente/Agenzia Commerciale: RE**

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**Al Fine di un Corretto Analisi Economica è Necessario Valutare, Oltre all’investimento per la realizzazione dell’impianto, gli interessi relativi a un eventuale finanziamento e i costi facoltativi di seguito elencati:**

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**Allegato A - Relazione tecnico-economica**

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SunBorè

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Condomani

- Social Network management involving three kinds of users
  - Condos Administrators
  - Flat Owners
  - Service Providers
Condomani - Awards

- Winner of the Start Cup Calabria 2011
- Selected for the InnovAction Camp 2011
- Quoted on “Corriere della Sera” (July 11, 2011)
- In Final at TechGarage 2011 (right now!)

Prototype: [www.condomini.oktago.com](http://www.condomini.oktago.com)
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## Related Work

<table>
<thead>
<tr>
<th>User Typology</th>
<th>Customization Extension</th>
<th>Plug &amp; Play Resource/Relation Taxonomies</th>
<th>SC/Resource Sharing/KDD Features</th>
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Conclusions

Borè is a new architectural paradigm for developing content-based web applications that:

☐ Allows the definition of new web resources
☐ Provides mechanisms for viewing, querying and storing resources
☐ Supports events and actions associated to the resources
☐ Provides a Social Network Environment
☐ Allows the analysis of resources and relations supporting knowledge-discovery tasks
Future works

- Effectiveness of the data-model in query-intensive environments
- Effectiveness of the suggested recommendations in terms or error metrics
- Workflow Engine integration
- Content Management Interoperability Services (CMIS) Integration
Thanks for your attention!