


This work has been supported by ESF project No. 2009/0216/1DP/1.1.1.2.0/09/APIA/VIAA/044

OLAP Personalization with User-describing Profiles

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BIR 2010

Outline

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- Classification of Existing Approaches of OLAP Personalization
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- User Preference Metamodel
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- Conclusions & Future Work

Personalization

- *Personalization* is a process of providing users with selected information on their specific needs*.

* - BNET Business Dictionary.

http://dictionary.bnet.com/definition/personalization.html

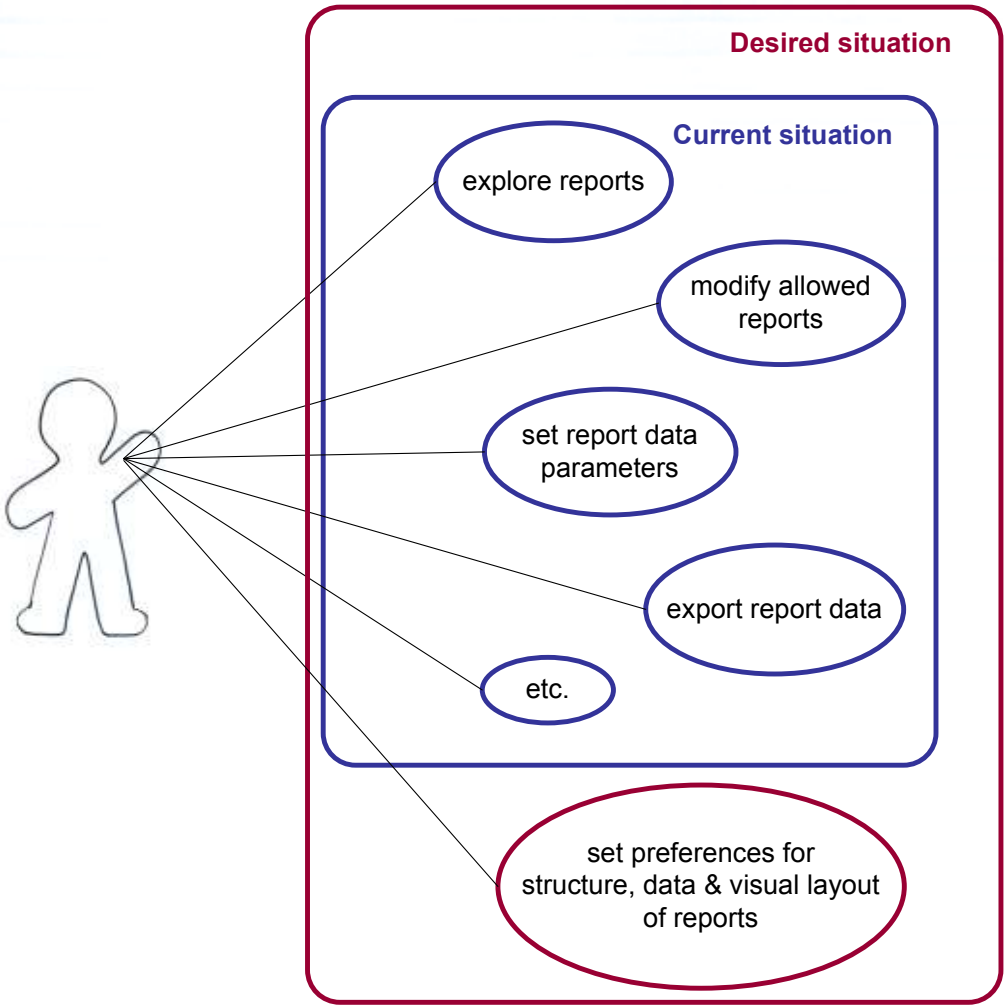
Why is OLAP personalization important?

- Typical problems in DW field:
  - Large volumes of data,
  - Burdening data exploration,
  - While exploring previously unknown data, the OLAP query result may highly differ from expectations.
- Possible solution – introducing personalization in the field of data warehousing.

Motivating example

- DW report management tool
- Different groups of users (e.g., students, professors, workers of the University, etc.).
- Each group or particular user has...
  - different needs for reports,
  - interest for different contents of the report,
  - different reports' layout preferences.

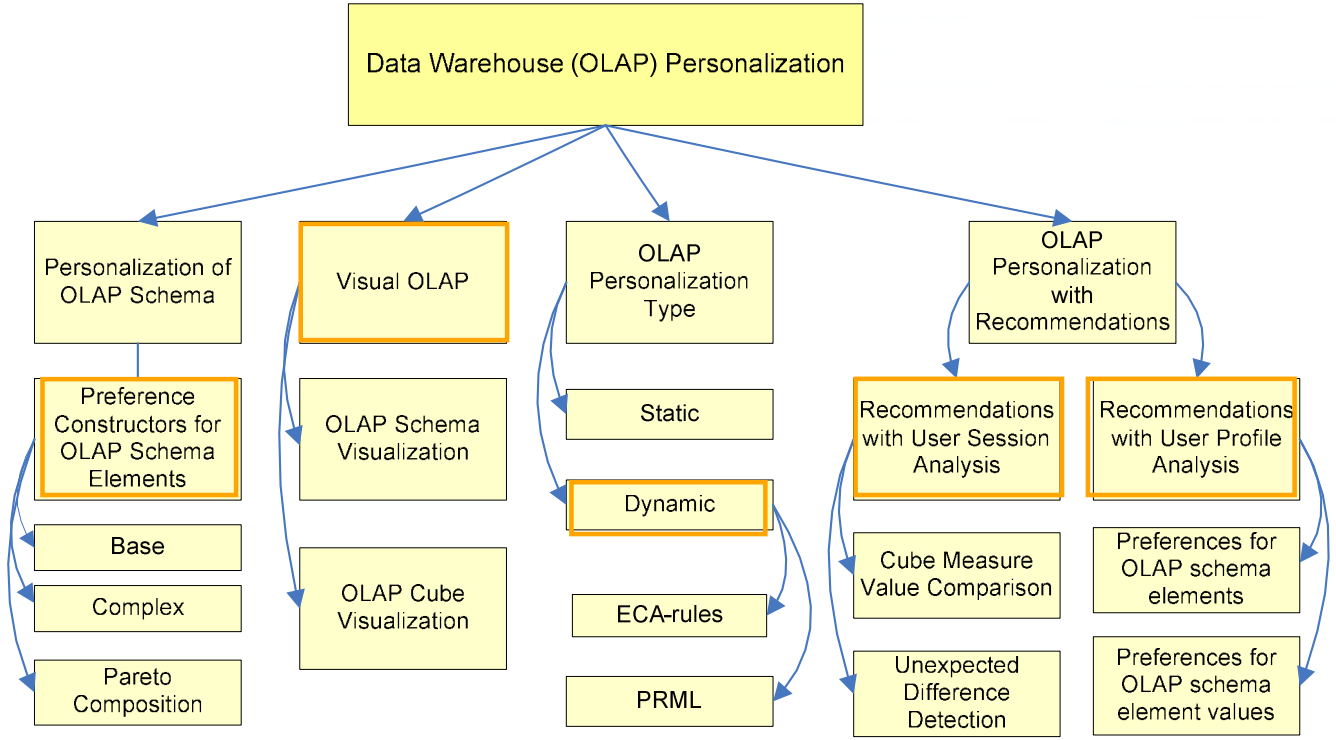
Motivating example (Cont'd)



How to provide user with the data he/she was looking for?

Introduce personalization into report management tool

Classification of Existing Directions of OLAP Personalization



The Concept of User-describing Profiles

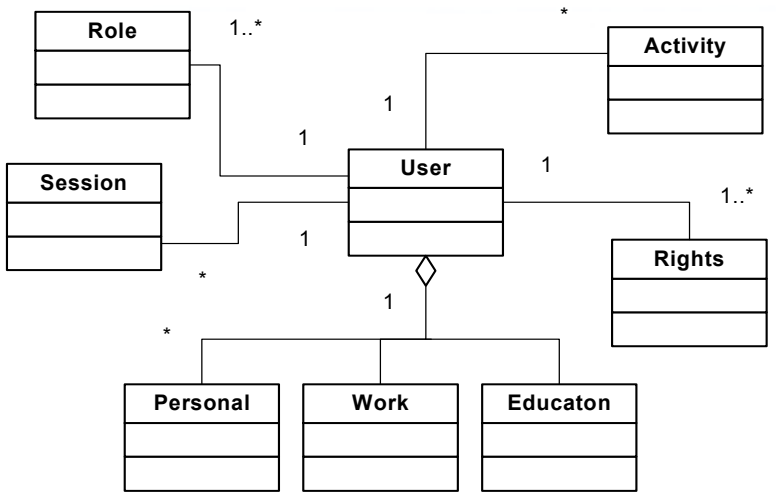
- To give a detailed characteristics of data warehouse user interaction with the system environment, Zachman Framework concept was used.

Question	Description	Profile Type
What is the user expecting to get as a result?	User preferences data	***Preferential***
Who is the user?	Basic user data (personal data, session, activity, rights, etc.)	***User***
Where is the user located?	User physical location data & geolocation, according to user IP-address	***Spatial***
When does the user interact with the system?	Time characteristics of user activities	***Temporal***
How does the user & system interaction happen?	Characteristics of user device (i.e. PC, laptop, mobile phone, etc.), which is used for signing in as well as user software (e.g. web browser) characteristics	***Interaction***
Why the user is interested in this particular system?	User preferences are being gathered and analyzed. Recommendations are generated, according to user characteristics and preferences..	***Recommendational***

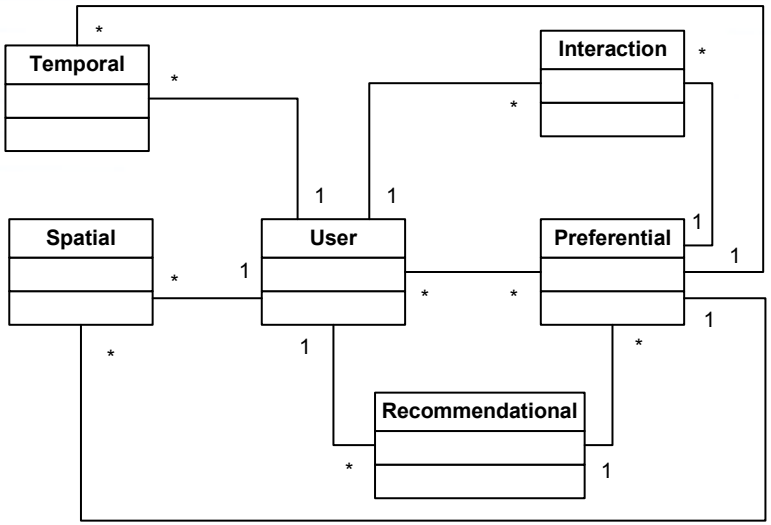
The Method for Profile Construction

- Literature studies:
  - Data Warehouse literature,
  - CWM standard (Common Warehouse Metamodel),
  - Scientific and technical articles
- Practical experience with data warehouse tools and web-services
- Collecting attributes from different information sources
- Splitting logically a set of attributes of each profile into classes

- User profile class diagram (without class attributes):



User-describing Profile Connections and Data Sources

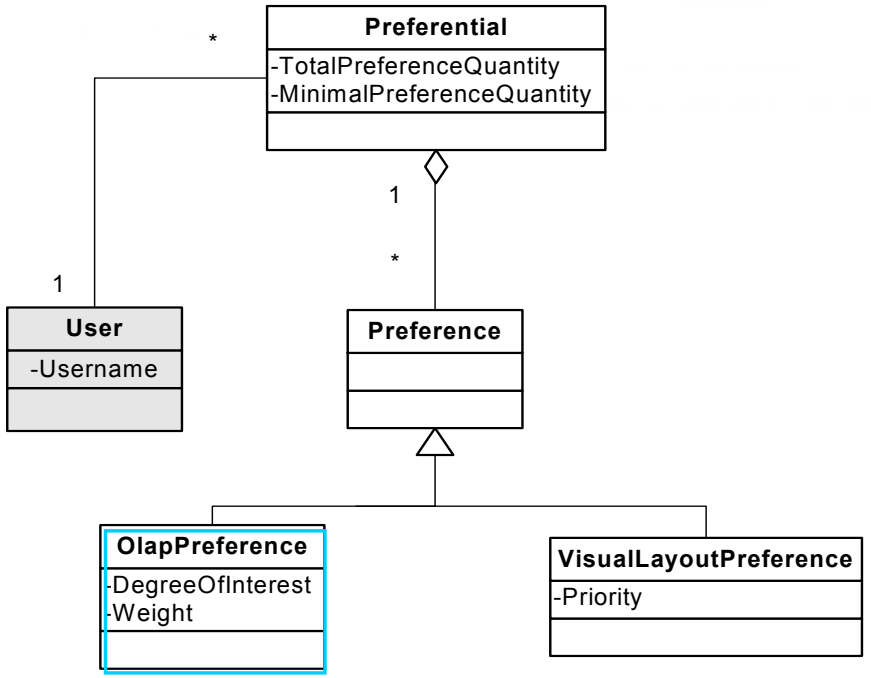


- User-describing profile connections

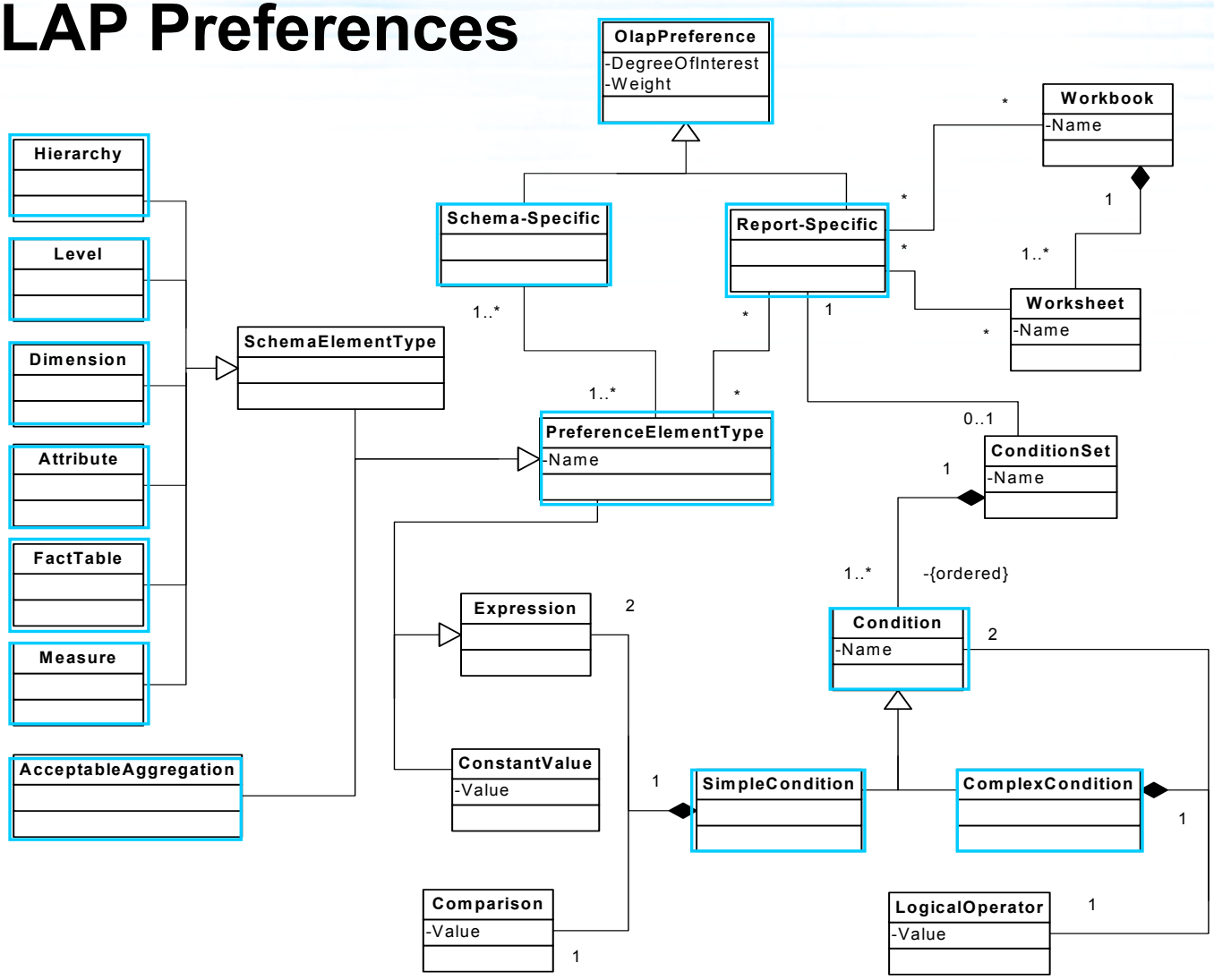
- User-describing profile data sources:
  - Context data,
  - Static data,
  - Activity data,
  - Analysis data,
  - Explicitly entered data.

User Preference Metamodel – A Fragment

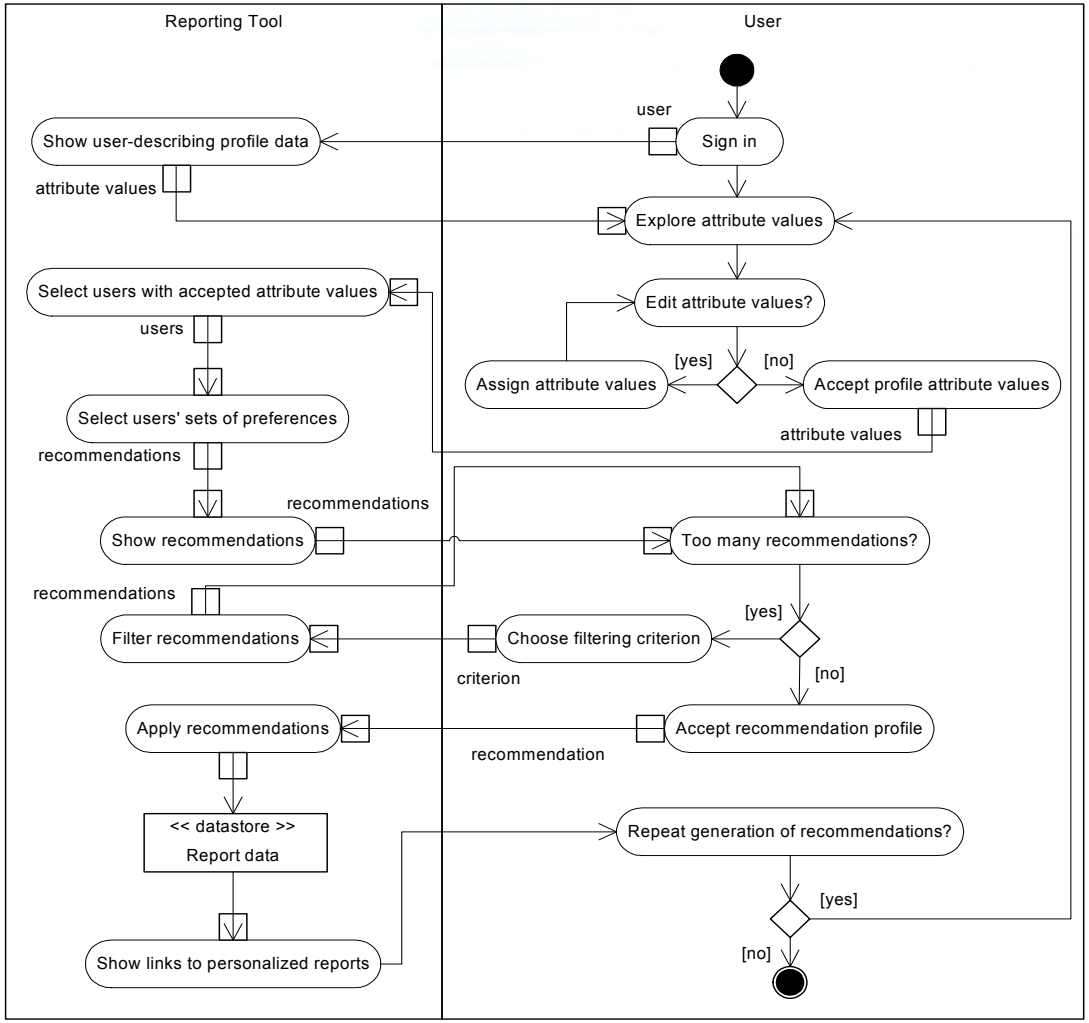
- Various user preference modeling scenarios have been considered, which later have been divided into two groups:
  - Preferences for the contents and structure of reports (OLAP preferences),
  - Visual layout preferences.



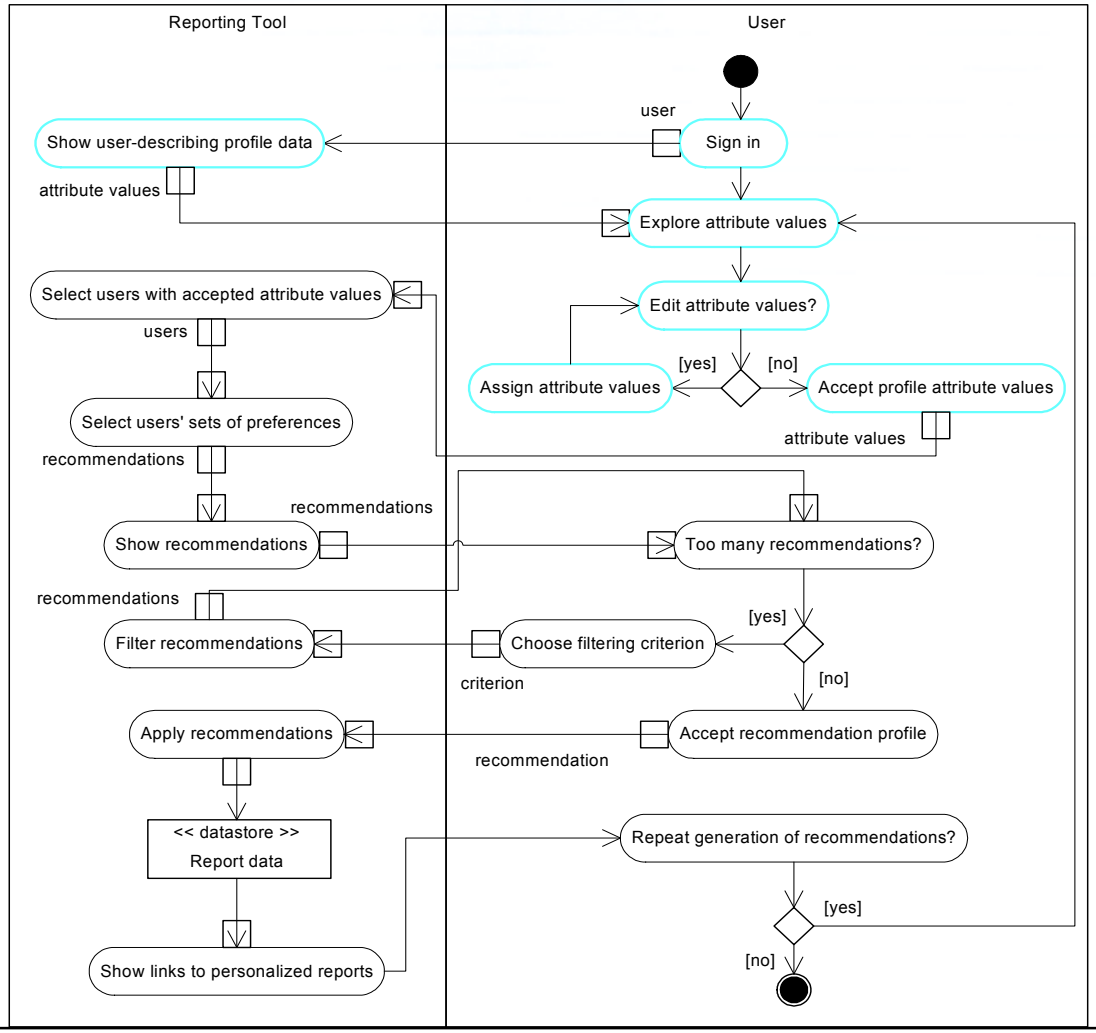
OLAP Preferences



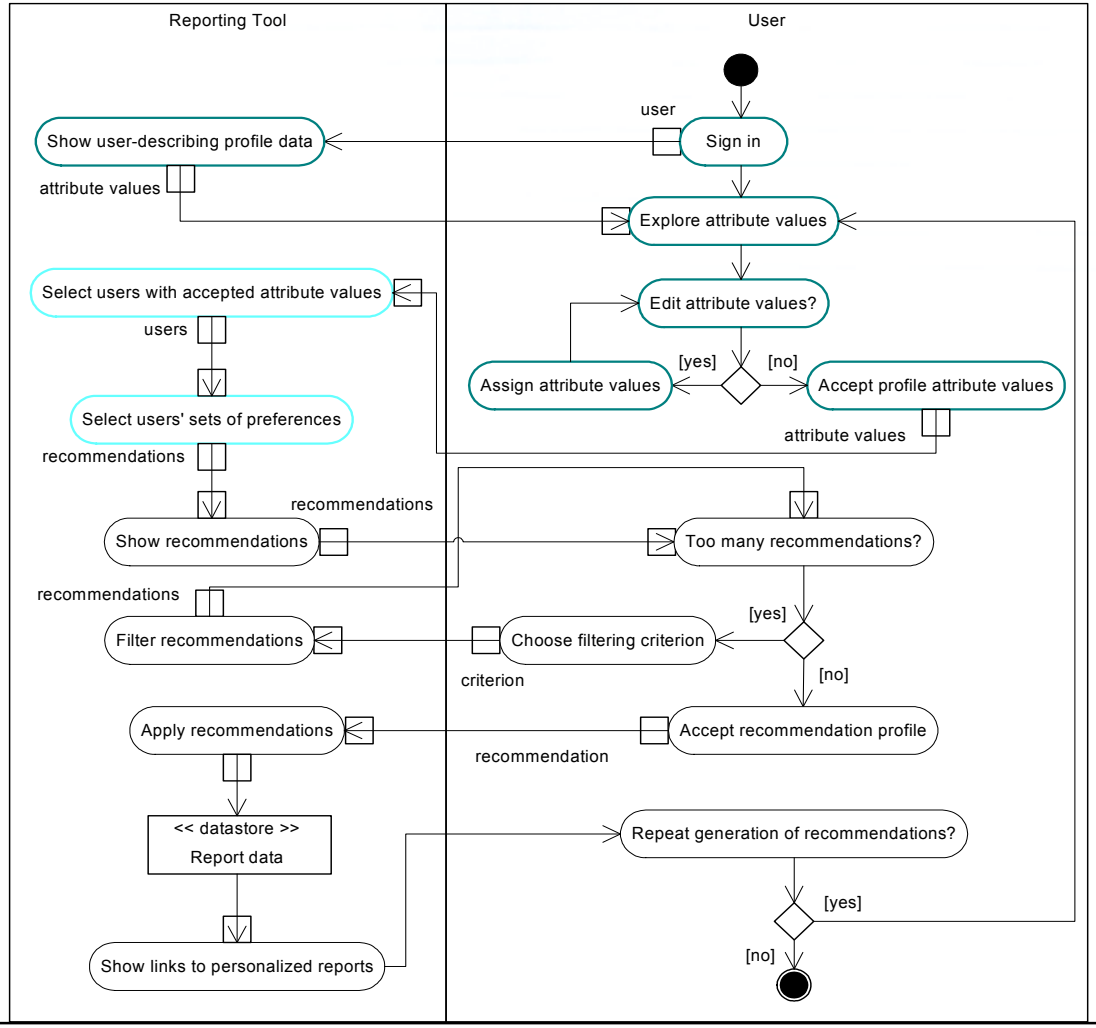
Concept of Recommendational Profile Development



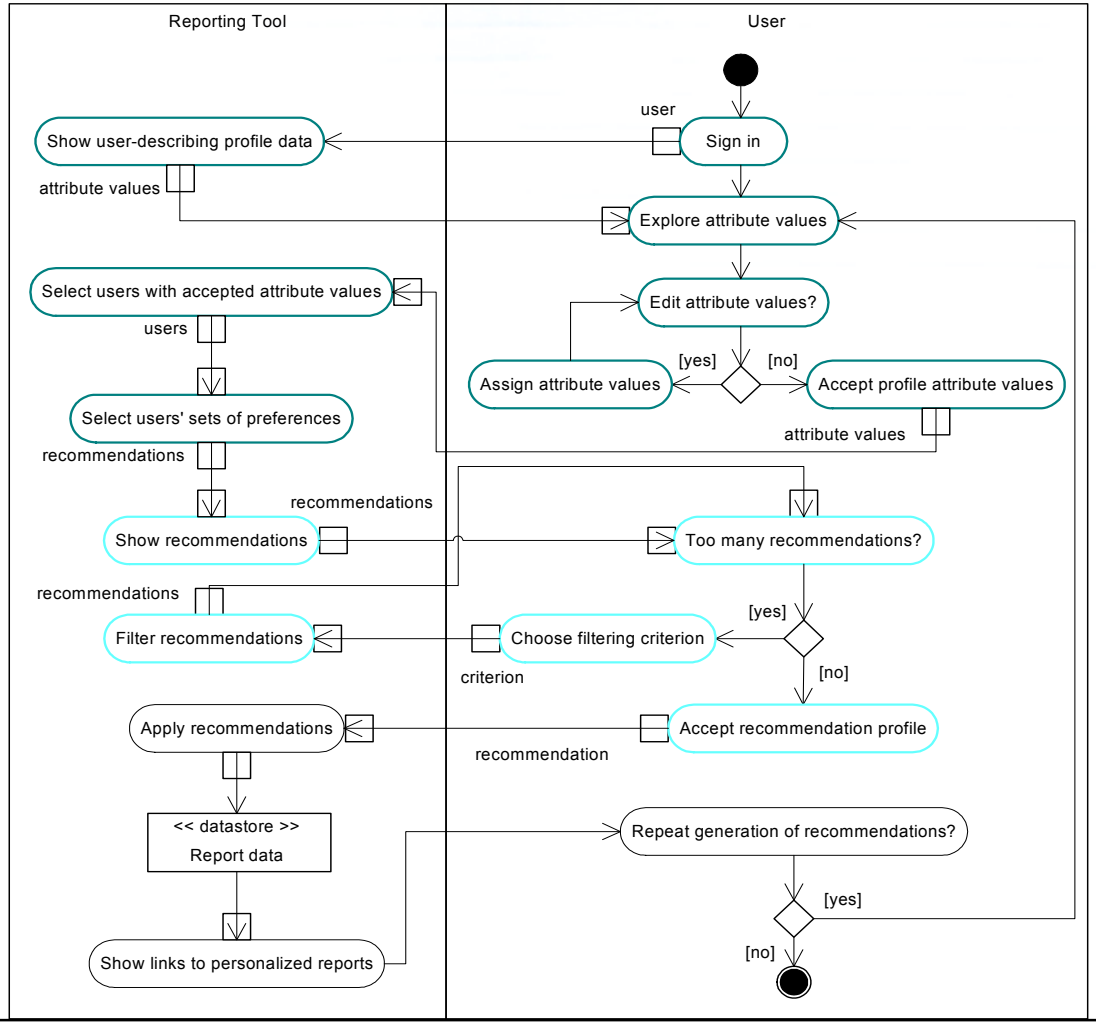
Concept of Recommendational Profile Development - Step 1



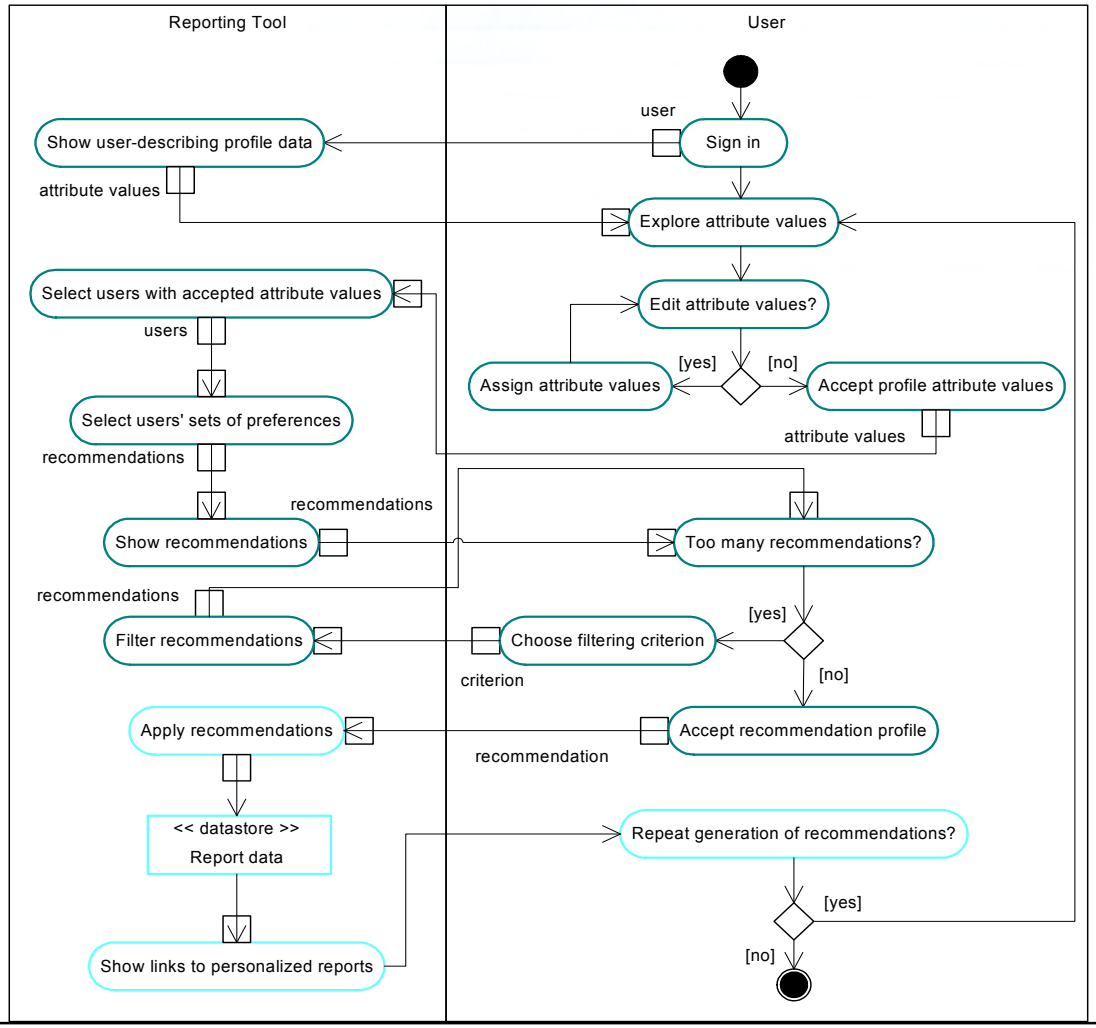
Concept of Recommendational Profile Development - Step 2



Concept of Recommendational Profile Development - Step 3



Concept of Recommendational Profile Development - Step 4



Conclusions

Steps of the suggested method:

- *Stating questions* (what…? who…? how…? etc.) to enable the description of data warehouse user/system interaction;
- *Identifying* the user describing *profiles*;
- *Collecting* possible user-describing profiles' *attributes* from various sources of information;
- *Generating* user *characteristics* via profile attributes after signing in the reporting tool;
- *Suggesting* possible *recommendations* for new and existing users, based on report preferences for the contents and structure of reports (OLAP preferences), and visual layout;
- Report personalization: *applying* selected *recommendations* to a report.

Future Work

- A detailed description of visual layout user preferences;
- Consider possible limitations of user-describing profiles:
  - incomplete or contradictory profile information,
  - evolution of profiles,
  - profile attribute updates, etc.
- Research the recommendation generation algorithms and recommendation filtering criteria in existing recommender systems of different domains;
- Gather and evaluate recommendation filtering criteria;
- Integrate personalization into the reporting tool.


Thank you!