

Object-Oriented Databases

Course Review

- Summary and Exam Information
- Ongoing Research Projects
- Student Projects



Course Summary

- I. Basics of Object-Oriented Databases
 1. Introduction
 2. Object Persistence
 3. db4o
- II. Advanced Concepts of Object-Oriented Databases
 4. Standards and Commercial Systems
 5. Storage and Indexing
 6. Version Models
- III. Semantic Object Data Management
 7. OM Data Model and OM Data Model Language
 8. Design and Implementation of OMS Avon
 9. Context-Aware Data Management

Exam

- Session examination
 - February 9th, 2009
 - Exceptions can be arranged for exchange students
- Oral exam in English
- Duration of 15 minutes
- 5 ECTS

Ongoing and Future Research Projects

- OMS Avon – OM Reference Implementation
 - GlobIS Architecture and Technologies Division (ATD)
- Collaborative Applications in Mobile Environments
 - Moira C. Norrie
 - Alexandre de Spindler
- Personal Information Management meets Web (PIM 2.0)
 - Moira C. Norrie
 - Stefania Leone
 - Eugenio Lentini
 - Michael Nebeling
- Creative Information Environments
 - Moira C. Norrie
 - ...

OMS Avon Projects

- Storage Layer
 - index structures
 - version model
 - native storage implementation
- Model Layer
 - query optimisation
 - constraint checker
 - methods
- Interface Layer
 - Eclipse plug-in for OMSjp
 - code generator for OMSjp
 - language binding
- Applications

Index Structures for OMS Avon

- Apply existing index structure to the OM data model
 - type layer → type hierarchy indexes
 - collection layer → signature file indexes
 - associations → path aggregation indexes
- Exploit the semantic richness and constraints of the OM data model to optimise index structures
- Implementation within OMS Avon
 - introduce management of index data structures into storage layer
 - implement index data structures in at least one storage provider
 - extend metamodel and interface of the model layer
- Evaluation
 - define a set of benchmark queries
 - measure execution time with and without use of index structures

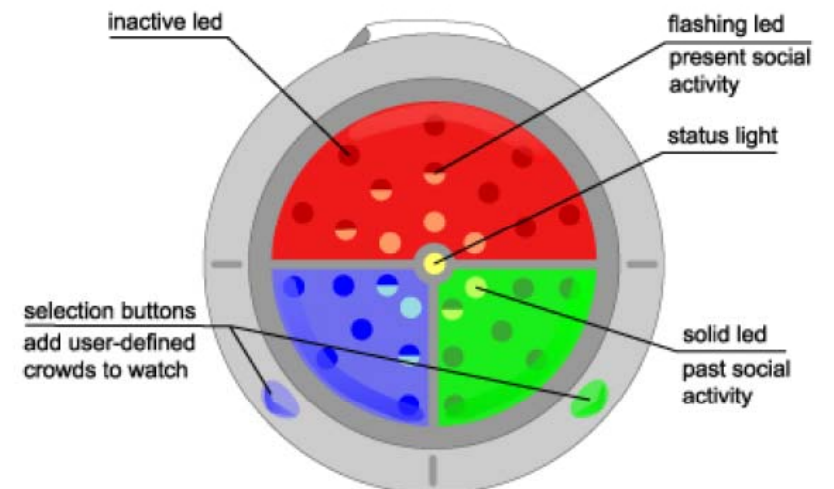
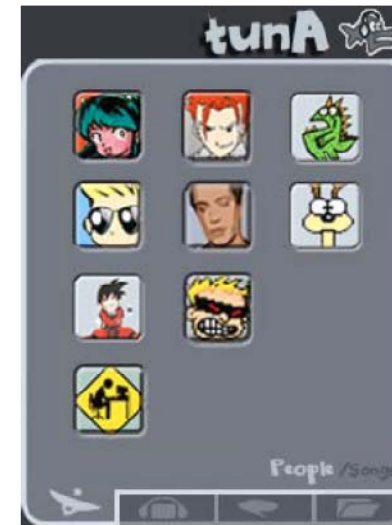
Query Optimisation for OML

- Dynamic optimisation of OML queries at run-time
 - known and novel algebraic optimisations
 - access path selection based on indexes
 - gather, manage and exploit statistics (system usage, data profiles...)
- Implementation with OMS Avon
 - extend OML query evaluator (AST → QT → OQT)
 - map nodes to access paths (direct access, index-based access)
 - query and data profiler
- Evaluation
 - define a set of benchmark queries
 - measure execution time with and without use of index structures

Eclipse Plug-In for OMSjp

- Integrated platform to support all stages of database and application design with OMS
 - modelling and prototyping
 - database management and browsing
 - code generation
- Implement an Eclipse plug-in reusing already existing code
 - database browser
 - schema editor
- Novel functionality
 - support for multiple databases
 - support for new features of OMSjp
 - tighter integration of database schema and application code

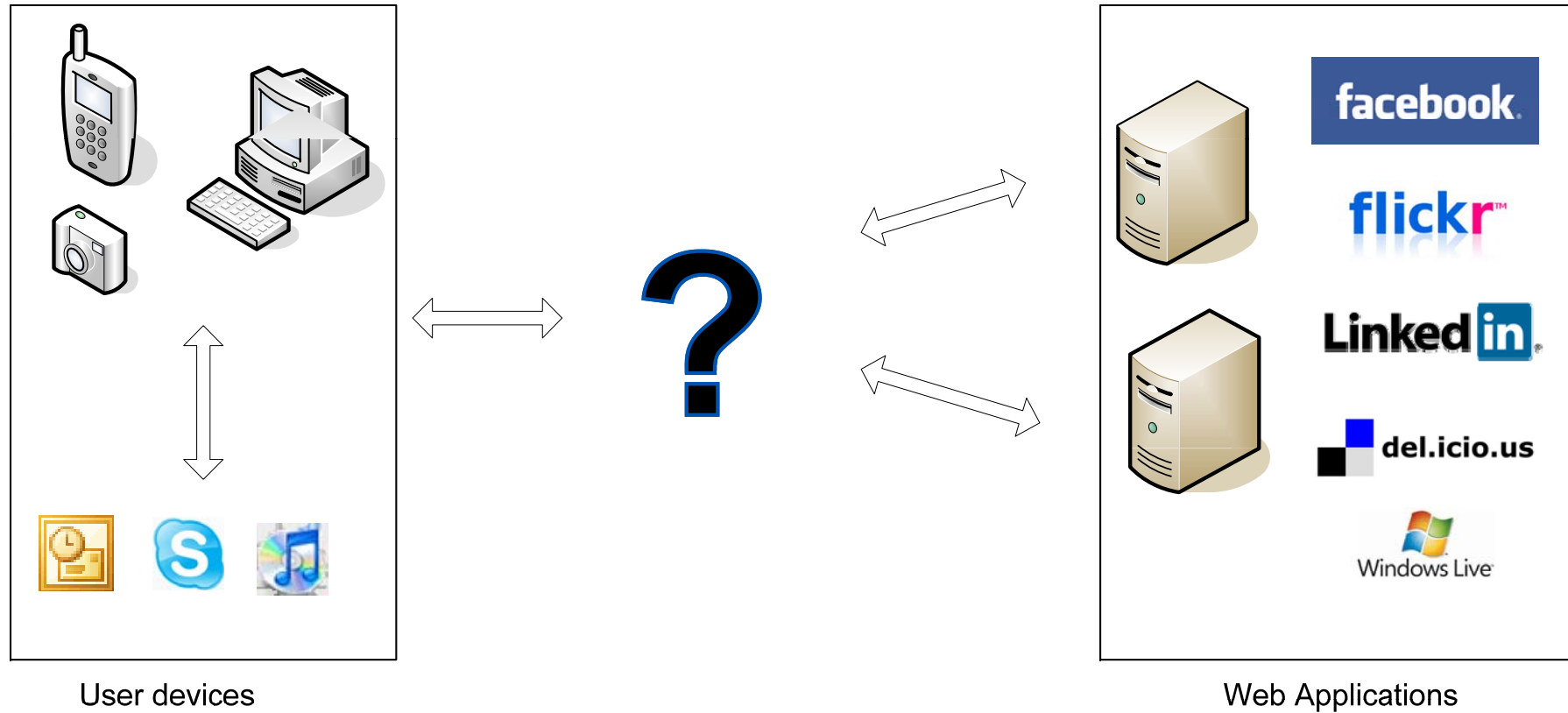
Mobile Social Applications



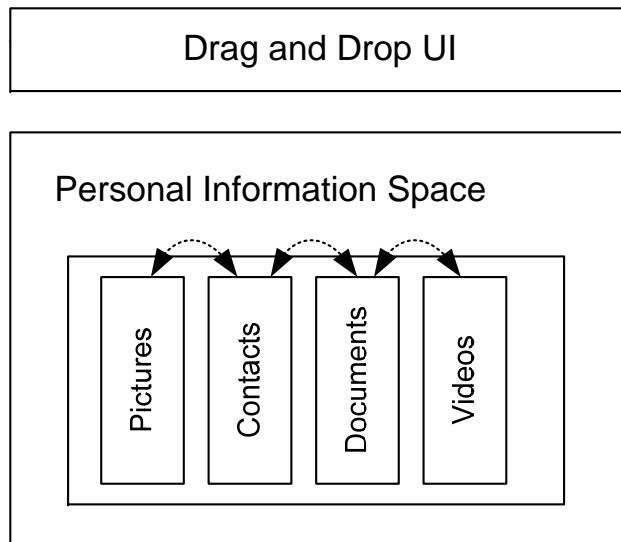
Mobile Phone Development Platforms



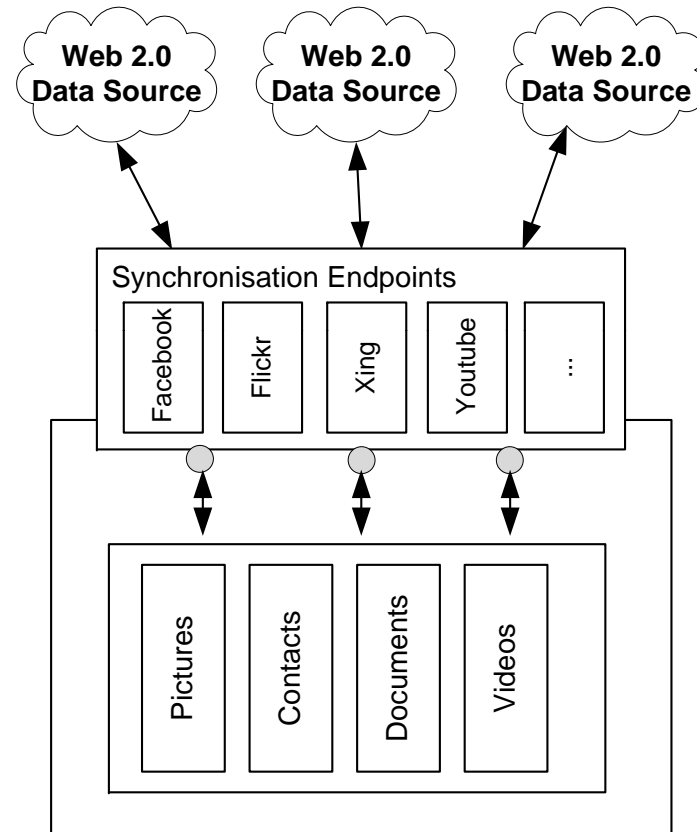
PIM 2.0



PIM 2.0



Data Management



Data Sharing

Possible Projects on Different Levels

- Querying PIM database
- PIM applications in general
- New generation photo album application
- Adapters for web sources
- Web 2.0 Technologies in general
 - Web-based data management

Creative Information Environments

- How technologies can promote creativity
- Making it easier for groups of users to capture and share various forms of information
- Support for social signal processing



Seamless Capture and Sharing of Information

- Object Databases to manage
 - large volumes of multimedia data
 - large numbers of different types of cross-media links
 - rich and varied forms of metadata
 - innovative forms of interaction
 - innovative ways of summarising, integrating and publishing information
- Tools to support
 - lightweight means of capturing information – audio, video, gestures, handwriting, sketching, selection by pointing etc.
 - ways of organising and sharing information
 - retrieval of information e.g. use of tag clouds and tag selection

Specific Object Database Projects

- Investigating performance of various object databases for management of large cross-media collections
- Investigating ways of improving performance of Avon for management of large cross-media collections
- Exploring hybrid-architectures for data and metadata management

Object-Oriented Databases

The End

