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

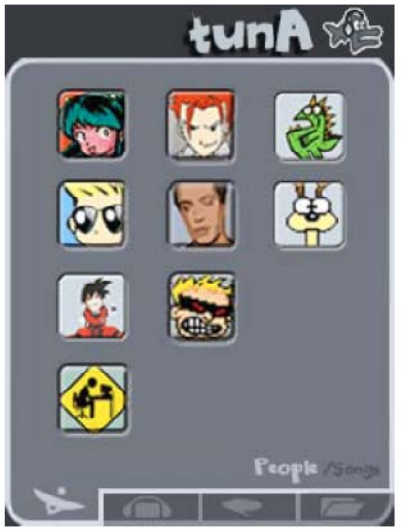
Query Optimisation for OML

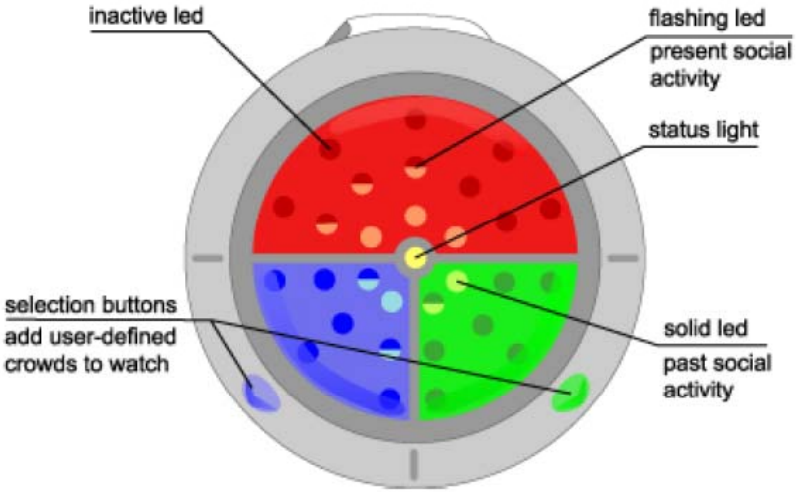
- Dynamic optimisation of OML queries at run-time
  - known and novel algebraic optimisations
  - access path selection based on indexes
  - gather, manage and exploit statistics (system usage, data profiles...)
- Implementation with OMS Avon
  - extend OML query evaluator (AST → QT → OQT)
  - map nodes 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

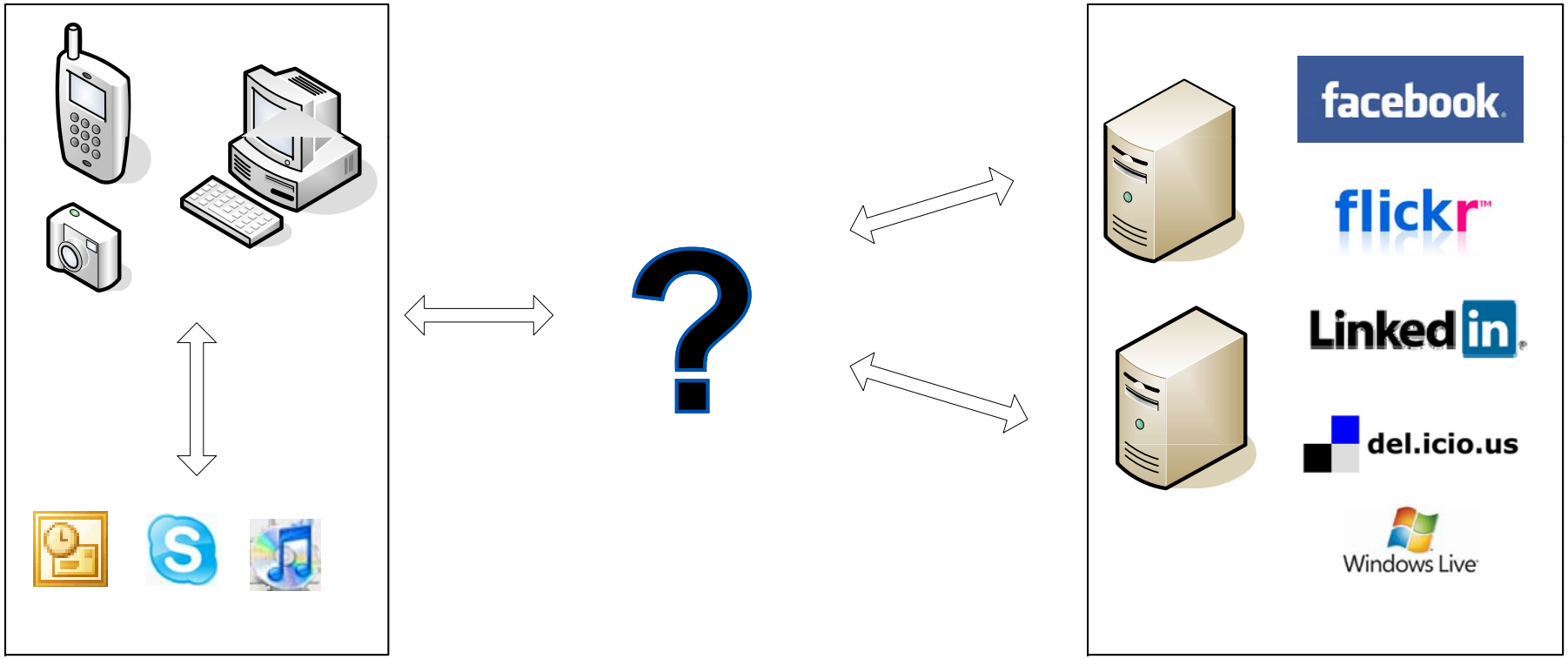
Mobile Social Applications





Mobile Phone Development Platforms

PIM 2.0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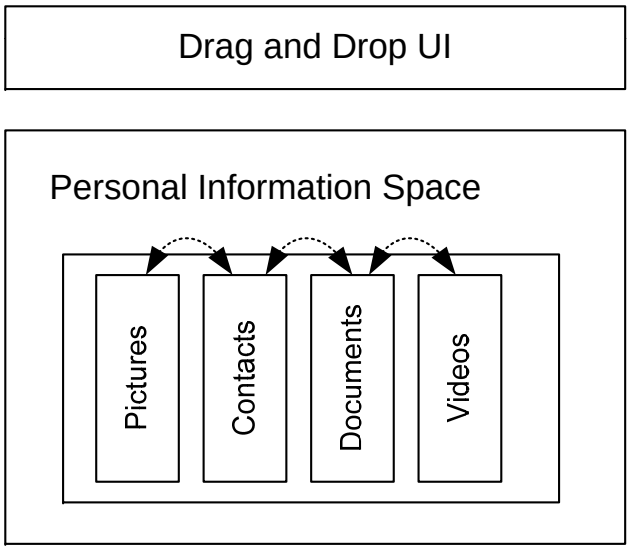
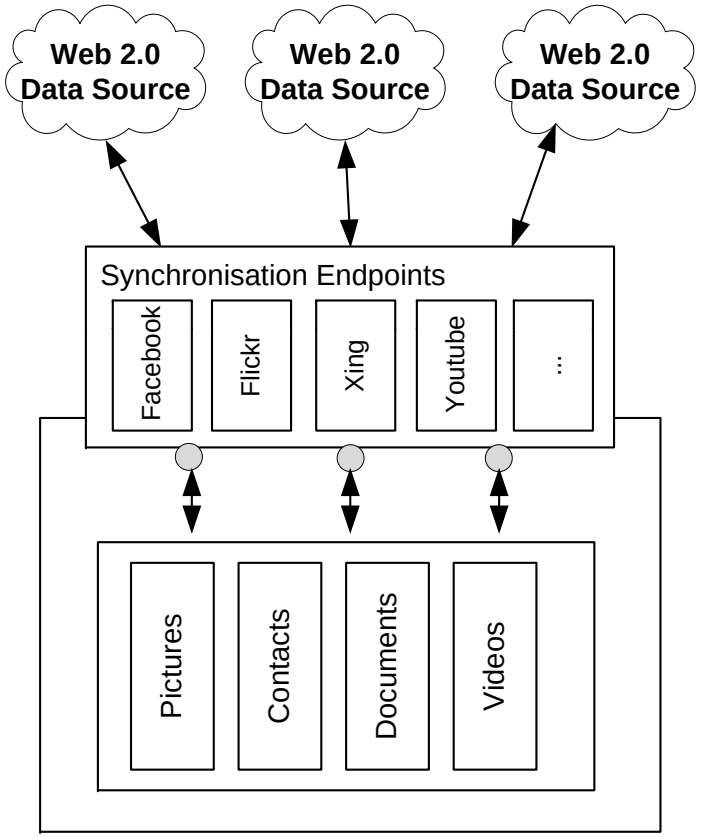
LinkedIn
del.icio.us
Windows Live
User devices
Web Applications

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