ADEMS, an ADaptable and Extensible Mediation Service application to biological sources

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Motivation and Objective

A generic framework for generating and configuring mediation systems well-adapted to specific application needs.

- Single access point to sources
- Global schema and query language
- Local sources transparency
- Human driven static process
- Lack of scalability in evolving systems
- Low flexibility

- Highly distributed information
- Different formats and data models
- Different query languages

A generic framework for generating and configuring mediation systems well-adapted to specific application needs.
"Two-Layer LaV" Approach

- Minimal and reusable mediators less sensitive to global schema changes

- Ontology to represent the global schema

- Local schemas mapped into a mediator schema using LaV

- Mediator schema mapped into the global schema using LaV
ADEMS Framework: source subscription

1. Source subscription to ADEMS:
   - exported schema
   - mapping rules between local and global schema
   - local DBMS capabilities

2. Wrapper generation

Diagram:
- ADEMS
  - Expression of Needs
  - Generation module
  - Metadata
  - Sources subscription
  - Wrapper

Database types:
- Relations
- FlatFiles
- Objects
ADEMS Framework: application subscription

1 Application subscription to ADEMS: needs expression in terms of concepts from the global ontology (global schema)

2 Adapter generation
ADEMS Framework: mediation system configuration

1. Activation of subscribed local sources related to a needs expression
2. Generation of mediator hierarchy

Resulting mediation systems are:
- well-adapted to user needs
- extensible
- reusable

ADEMS
Expression of Needs
Generation module
Metadata
Sources subscription

Adapter 1
Adapter 2
Wrapper
Wrapper
Wrapper
Mediator 1
Mediator 2
Application 1
Application 2

Relations
FlatFiles
Objects
Ontology driven query (OQ)

Protein_secondary_structure which
secondary_structure_of Protein which
has_accession_number Accession_number "P29312"

Translating

Global expression (Q)

Protein_secondary_structure
has_secondary_structure
secondary_structure_of
Protein
accession_number_of
has_accession_number
Accession_number "P29312"

Rewriting

Local expressions (Q1, Q2)

Q1
Protein
Accession_number "P29312"

Q2
Protein_secondary_structure
Protein

Application
Adapter
Mediator
Wrapper
Wrapper

Biological mediation system