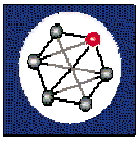

Workshop of Data Access Patterns, Technologies and Frameworks at Malaga University on 5-6 May 2010

Prerequisite and pre-studies:

The students know

- relational database and SQL basics in terms of creating tables with integrity constraints
- basics of Java programming
- basic concepts of XML

Recommended readings:
the DBTech tutorials
- CCLabs / SQL Concurrency Technologies
- XML and Databases.

Schedule for the workshop days is following

(09-11 Project's internal working session)
11-14 Theory lesson and introduction to the afternoon Lab session
14-15 Lunch break
15-18 Hands-on session with instructors at laboratory classroom workstations

Software to be used in the labs
Platform: Debian Linux on VirtualBox virtual machine
Databases:

- DB2 Express-C V9.5 /9.7
- Oracle 10g XE

Programming languages and tools:

- Java SE, JDO, Hibernate
- JBoss

Theme of Wednesday 5 May 2010 is "Data Access Technologies"

Opening session: Dimitris Dervos

Instructors: Martti Laiho and Fritz Laux

The theory part covers short introduction of

- Overview of DA Technologies and Architectures
  - from ESQL and CLI to Wrappers and Class Libraries
  - Priorities: reliability, performance, scalability
  - Architectures: Client/Server to n-Tier (application server and Web server)
- Basic data access patterns and reliability
  - JDBC API: connection, statement, result set, procedure calls
  - ADO.NET API: connection, statement, result set, procedure calls, disconnected mode (just short overview of the paradigm, comparison with JDBC)
  - Parameter binding for security
  - ACID transaction and concurrency control
    - Isolation levels, CC services: LSCC/MVCC/OCC
  - DAO pattern
  - Retryer pattern
  - RVV Discipline preventing blind overwriting of data (aka optimistic locking)
  - (global transactions built of local transactions)
- Performance and Scalability
  - Parameter binding for performance
  - Application server and connection pooling
  - Server-side vs client-side caching of data
  - Server-side caching of plans (vs client-side?)
- the tools and the exercises in the afternoon lab

Hands-on workshop part

- working environment is a virtual computer on every workstation, having all needed software installed in the image
- JDBC connections to DB2 and Oracle
- Statement, PrepareStatement, CallableStatement experimenting
- Transactions, basic concurrency conflict exercises, bank transfer
- RVV exercise on avoiding blind overwriting
- TPCA2 experiment on performance and scalability of DB2 Express-C

The learning outcome:

- experience on use of a virtual computer
- experience on operating with mainstream databases
- working knowledge of using JDBC and transactions
- understanding need for concurrency control and RVV

Theme of Thursday 6 May 2010 is "Data Access Frameworks"

Instructors: Arvo Lipitsäinen, Fritz Laux

The theory part covers short introduction of

- Object-Relational Mapping (ORM)
  - OOP domain model and relational model mismatch
    - reusable classes
    - inheritance, polymorphism, subtypes
    - associations: many-to-many
- Persistence Frameworks:
  - Java EE, JDO, Hibernate, JPA
- Introduction to JDO
- JBoss implementation of JPA

Hands-on workshop part

- working environment is a virtual computer on every workstation, having all needed software installed in the image
- JDO example
- ORM exercises using JBoss

The learning outcome:

- Understanding of concepts of ORM
- working knowledge on basics of JDO, Hibernate

Post activities

Reading of Appendix 6 & 7 of the RVV Paper (www.DBTechNet.org/papers/RVV_Paper.pdf)

(optional)
Students will write their reports of the experiences in these workshops to the folder of the Malaga workshop at http://dbtech.uom.gr portal