Development of an Eiffel connector for Db4o object oriented database

PROJECT PLAN

Type of project	Master thesis
Project period	October 4th 2007 – April 4th 2008
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Status	Diplom semester
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Supervisor name	Marco Piccioni

1. PROJECT DESCRIPTION

Overview

Db4o is an established OODBMS solution for Java and .NET. As Eiffel is already integrated in the .NET framework, the task is to implement the necessary Db4o interfaces to make Db4o usable within Eiffel applications.

Scope of the work

More specifically, as Db4o already has a pluggable reflector API, the aim is to write a special reflector implementation for Eiffel. A reflector basically defines to Db4o what an object is and how to get and set attributes.

The work will focus on adapting specific features of Eiffel to work with db4o, like multiple inheritance, whereas the .NET framework only supports single inheritance.

Development language: Eiffel for .NET. C# will be used only in case more advanced reflection capabilities should be needed

Intended results

A fully functional implementation is intended. The foreseen scenario is that the implementation will be completely transparent to the Eiffel programmer who will just use the already existing db4o API interfaces that in turn will provide the correct implementation for Eiffel.

2. BACKGROUND MATERIAL

Reading list

- Bertrand Meyer: *Object-Oriented Software Construction, 2nd edition*, Prentice Hall, 1997.
- db4o tutorial, reference documentation, API documentation; Online at: http://developer.db4o.com/Resources/view.aspx/Documentation

- *.NET Framework Developer's Guide, Reflection Overview*; Online at:
  http://msdn2.microsoft.com/en-us/library/f7ykdhsy.aspx

3. PROJECT MANAGEMENT

Objectives and priorities

- Db4o-specific reflector which supports multiple inheritance of Eiffel (high priority)
- Support for objects with attached and reference types (high priority)
- Native Queries (high priority)
- Tuples (medium priority)
- Genericity (medium priority)
- Agents (medium priority)
- Query-by-example (low priority)

Criteria for success

The project is considered successful as far as all objectives of high and medium priorities are met.

Method of work

A weekly meeting with Marco Piccioni is held to keep track of the progress.

Quality management

Documentation

- Master thesis report
- User guide: a tutorial for Eiffel developers and a framework presentation for web
- Developer's guide: API documentation with Eiffel BON diagrams
- A project page maintained on the Origo platform

Validation steps

Unit tests for steps 2-10 described in the "Project steps" section will be provided.

4. PLAN WITH MILESTONES

Project steps

1. Getting started: getting familiar with db4o, Eiffel for .NET and the reflection mechanism on the .NET framework

The project will be managed iteratively from now on: every step will involve design, implementation and test phases, and will deliver a partially functional but working product. The following steps will add functionalities to the product in this iterative fashion:

2. Objects with attached types
3. Objects with reference types
4. Objects with attached and reference types
5. Tuples
6. Multiple inheritance
7. Genericity
8. Agents

9.   Native queries
10. Query-by-example

Final activities:

11. Writing the master thesis report
12. Completing the "User Guide" and the "Developer's Guide"

Deadline

April 4th 2008

Tentative schedule

1.   Getting started: getting familiar with db4o, Eiffel for .NET and the reflection mechanism on the .NET framework → October 12th 2007
2.   Objects with attached types → October 19th 2007
3.   Objects with reference types → October 26th 2007
4.   Objects with attached and reference types → November 2nd 2007
5.   Tuples → November 23th 2007
6.   Multiple inheritance → December 14th 2007
7.   Genericity → January 11th 2008
8.   Agents → February 1st 2008
9.   Native queries → February 22th 2008
10. Query-by-example → March 7th 2008
11. Writing the report → March 28th 2008
12. Completing the "User Guide" and the "Developer's Guide" → April 4th 2008

REFERENCES

[1] Bertrand Meyer: *Object-Oriented Software Construction, 2nd edition*, Prentice Hall, 1997.

[2] Jim Paterson, Stefan Edlich, Henrik Hörning, and Reidar Hörning: *The Definitive Guide to db4o*, Apress, 2006.

[3] Raphael Simon, Emmanuel Stapf, Bertrand Meyer: *Full Eiffel on the .NET Framework*; Online at: http://msdn2.microsoft.com/en-us/library/ms973898.aspx

[4] *.NET Framework Developer's Guide, Reflection Overview*; Online at: http://msdn2.microsoft.com/en-us/library/f7ykdhsy.aspx

[5] db4o tutorial, reference documentation, API documentation; Online at: http://developer.db4o.com/Resources/view.aspx/Documentation