MDA

A Case Study

Espalier Technologies

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Agenda

- Introduction
- MDA fundamentals
- AndroMDA
- Case Study
- Demonstration

Introduction

- Who am I
  - Middleware specialist (engineering)
  - Security (PKI)
  - Performance (Clustering)
  - WebLogic, JBoss
- Why MDA
  - Project exposure
  - Project development: use new tools but at lower cost

MDA Fundamentals

- MDA provides an approach for, and enables tools to be provided for
  - specifying a system independently of the platform
  - specifying platforms and choosing a particular platform for the system, and transforming the system specification into one for a particular platform.
- The three main goals of MDA through the use of architectural separation of concerns are:
  - portability
  - interoperability
  - reusability

MDA Terminology

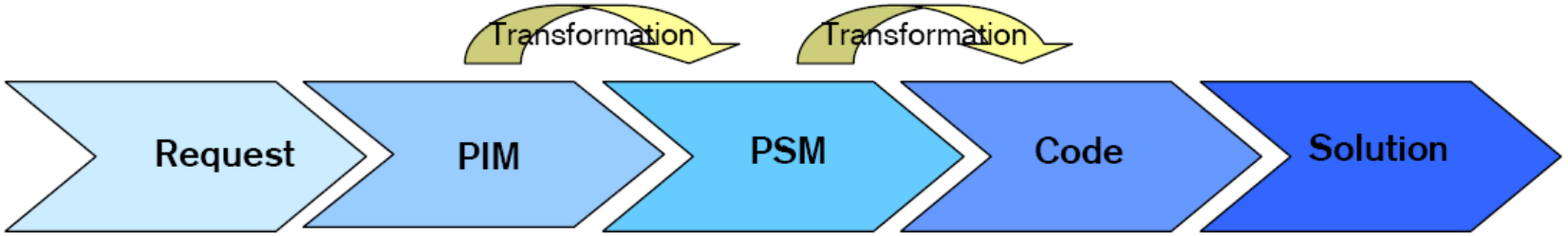
- Basic concepts of MDA are
  - its model-driven
  - it supports transformations
  - provides different views
- Models
  - Computation Independent Model (CIM)
  - Platform Independent Model (PIM)
  - Platform Specific Model (PSM)

MDA: Platform Independent Model

- With MDA the initial goal is the creation of a Platform Independent Model (PIM), this model is a one-or-one mapping of a Mental Model (MM) into a more formal language such as UML.
- Advantages
  - It is a very straightforward translation process
  - The developer/architect keeps focus on the business logic, not the underlying technology
  - The PIM can be reused later, it is not bound to any existing platform
  - The PIM is a useful medium to communicate ideas to others

MDA: Platform Specific Model

- The next step is to have a way to transform the PIM into program code, the MDA way of doing this is to gradually refine the model into a more Platform Specific Model (PSM) and transform this model into the code that normally would be written manually.



MDA Experience

- OptimalJ (2002)
  - Global Commodity Trading
  - Common Reference Project (Entity, JMS)
  - Global Accounting System (Entity, Web tier)
  - WebLogic 6 - 8.1, JBoss, Oracle 9i
  - Altura libraries, hard to integrate, expensive templates
- ArcStyler (2005)
  - International Bank
  - Service (Business) Facades
  - WebLogic 8.1, CORBA
- AndroMDA (2007)
  - International Bank
  - Reporting Service, Payments Monitoring Solution
  - WebLogic 9.2, Oracle 10g (RAC)

AndroMDA

- AndroMDA is an MDA framework for transforming models (usually UML models stored in XMI produced from case-tools) using a combination of plug-ins (cartridge and translation libraries) and to produce custom components.
- A very important thing to know about AndroMDA is that the transformation process is controlled using plug-ins called cartridges and each cartridge is very easy to tune.
- AndroMDA was developed to help eliminate boring and repetitive tasks, while at the same time allowing a model to really communicate what the system is doing: it is not meant be a Silver Bullet solution

See more at http://www.andromda.org/

AndroMDA: J2EE

- AndroMDA is mostly used by developers working with J2EE technologies
- Out-of-the-box AndroMDA can setup a new J2EE project from scratch, in which code is generated from a UML model
- Can be used to generate code for Hibernate, EJB, Spring, Web Services, Struts, JSF, Seam and more
- The generated code is automatically integrated into the build process using Maven
- Allows to keep focus on business logic
- Integrates out of container testing (Spring or micro-container)

See more at http://www.andromda.org/

Why MDA and AndroMDA

- It eliminates the need to write redundant code
- Project models reflect the actual code
- Projects are documented/diagrammed in a standard platform independent way making it much easier/faster to adapt to ever rapidly changing technologies
- Artifacts (models) that allow much easier communication with the business
- AndroMDA is not commercially marketed but the product speaks for itself:
  - community driven
  - visionary but pragmatic
  - open and modular
  - documented and release driven

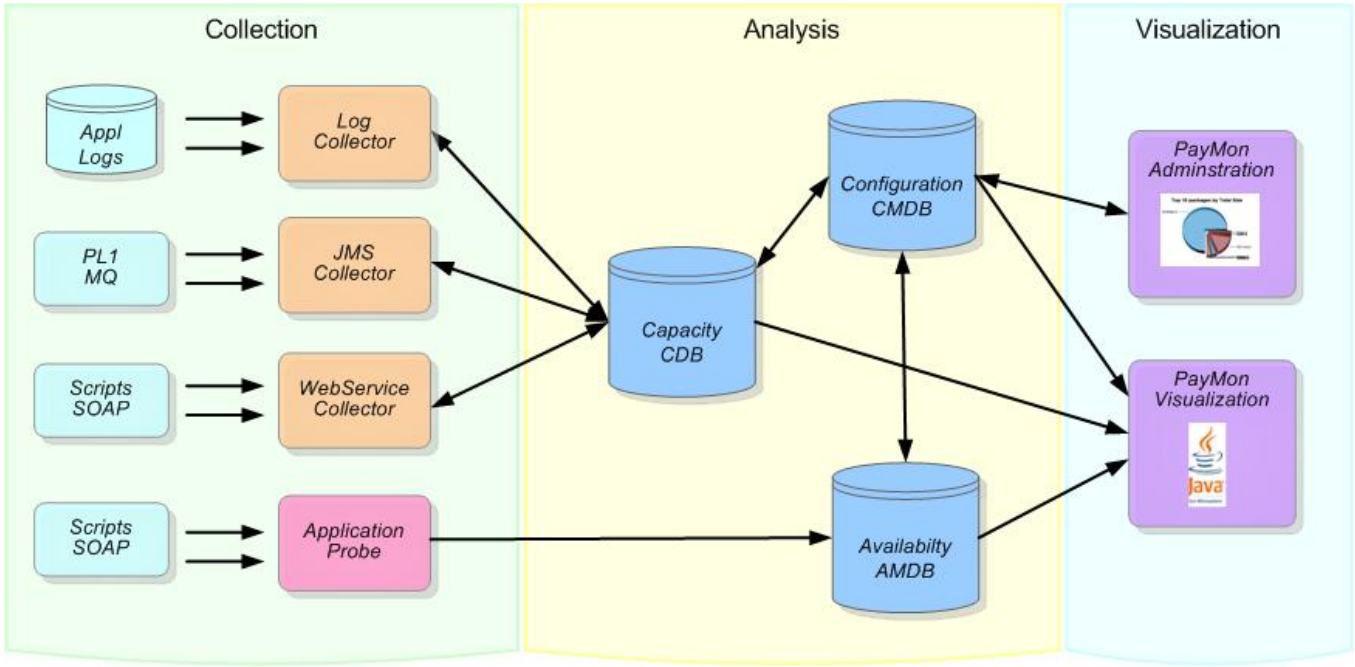
Challenges using AndroMDA

- Steep initial learning curve
  - learning how to model to generate the correct artifacts
  - learning the maven build lifecycle
  - good initial documentation for examples, lacking more advanced samples
  - complexity of combining open source tool set (Hibernate performance and mappings)
- Changing between different cartridges is not as transparent as expected
  - experience needed to discover best practices and pragmatic solutions (EJB3, Hibernate, HQL and OCL)
- XMI interoperability (MagicDraw, RSM) and dependency on custom profiles

Case Study: Project Details

- Banking environment
  - 1 analyst
  - 1 project management
  - 2 developers
  - 2 off shore developers
- Scope
  - Phase one: prototype, analytical log processing, metrics data model and BIRT reporting
  - Phase two: SLA management, alerting, complex pattern matching

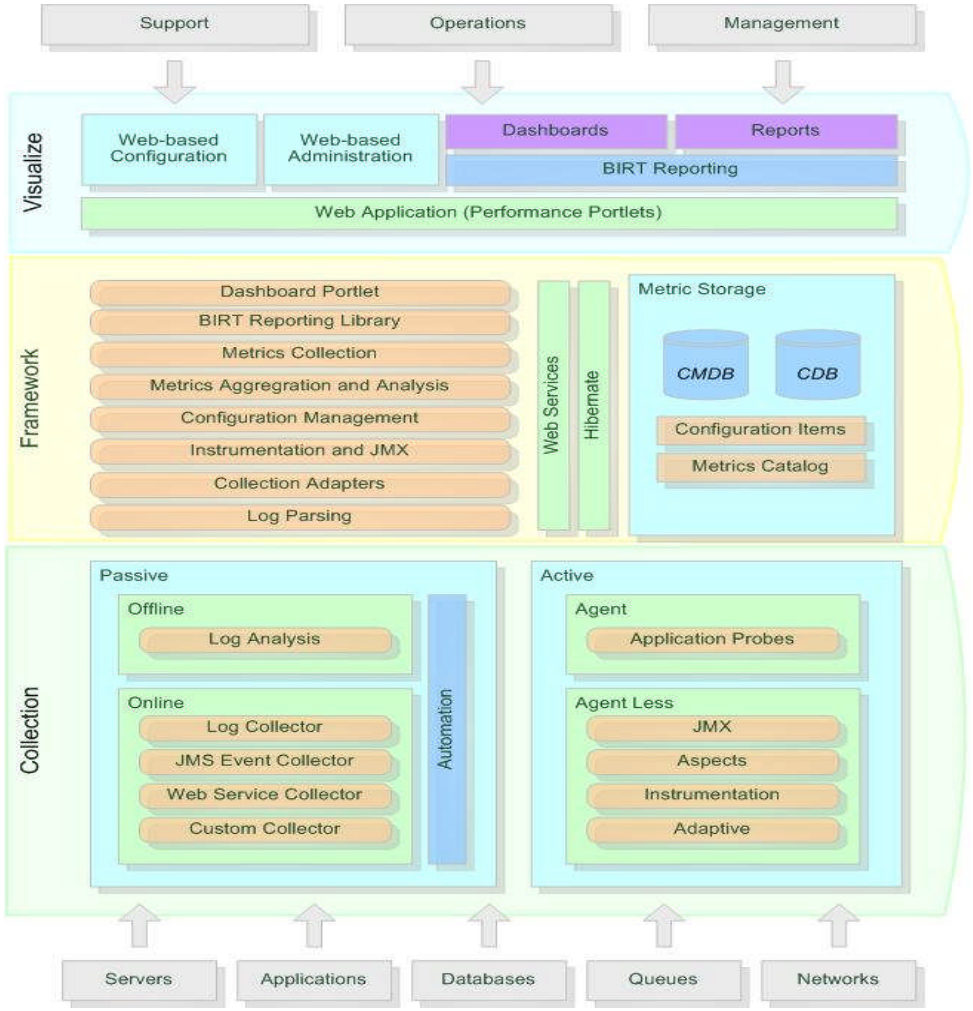
Case Study: Payments Monitoring



- Custom collectors
  - High throughput
- BIRT Reporting
- Cockpit
  - Dashboards (JSF)

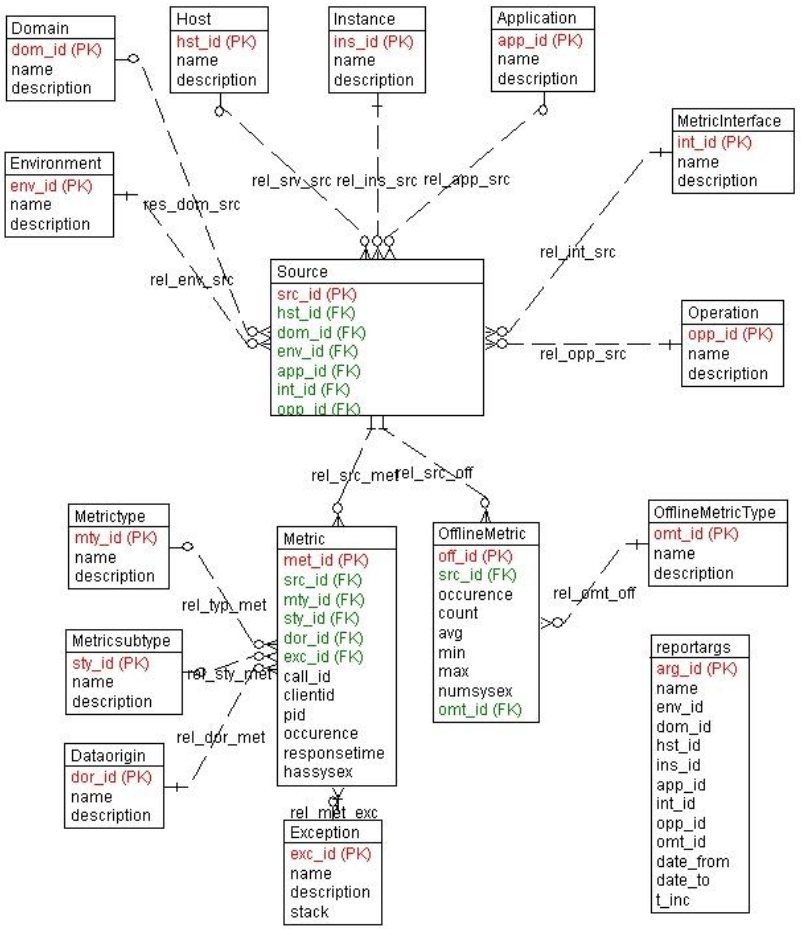
- Services
  - Reference Services
  - Reporting Services
  - Alerting Services

Case Study: Requirements



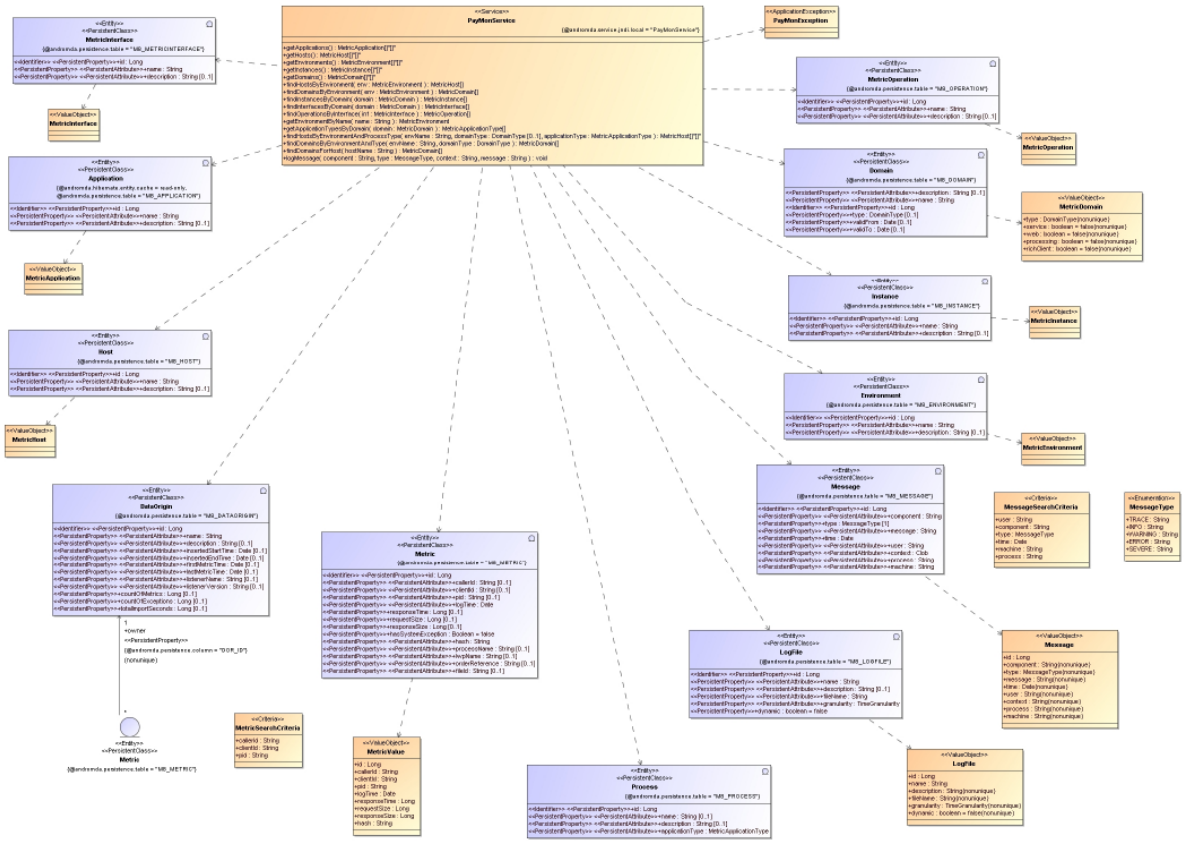
- Requirements
  - Open Source
  - Hibernate support
  - Web Services support
  - Java Server Faces Support
- Flexible build for integration into various target platforms
- Support for various modeling tools (UML)

Case Study: Payments Monitoring



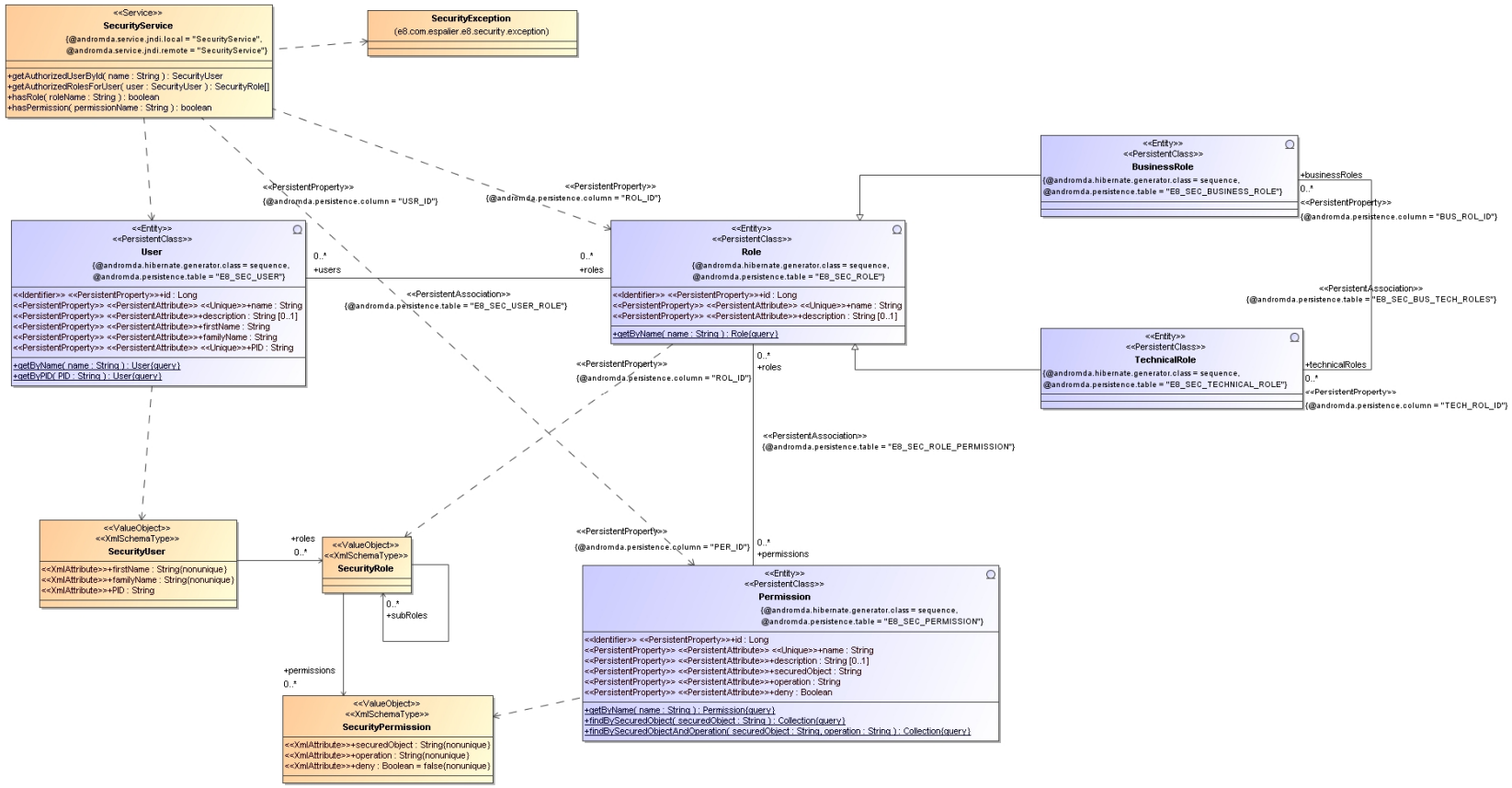
- Built on existing proven database model
- Managed evolution of model using MagicDraw
- Support distributed development (Off Shoring)

Case Study: Payments Monitoring



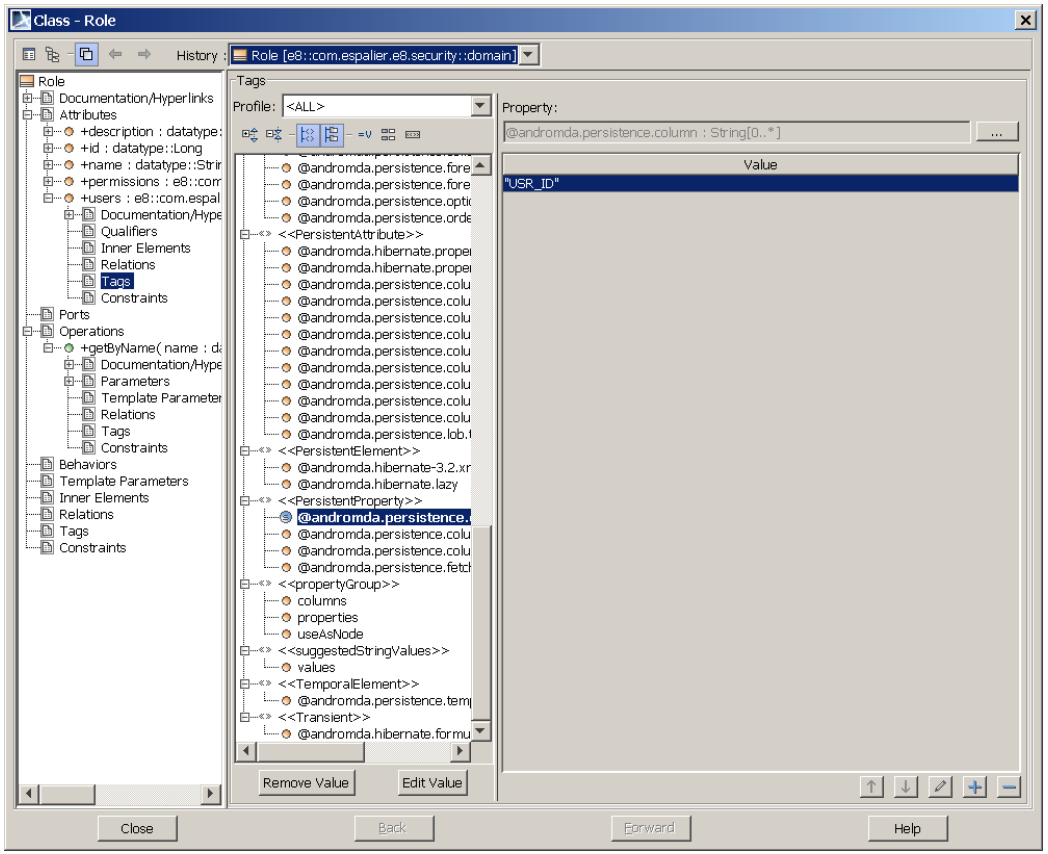
- 500-600 generated artifacts
  - services
  - value objects
  - entities (DAO)
- 100% generated ORM layer
- 90% service code generated
- code for business implementation in services
- JSF and web tier coded manually

Demonstration



- Generic Authorization Model

Demonstration



- Excellent support for ORM mapping using Hibernate
- Tags for managing artifact generation (services, value objects, entities)
- Optimized round trip engineering
- Integrated support for JUnit using Spring cartridge
- Improved quality through documentation and testing

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